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What is this course?

PL-900 Power Platform Fundamentals

Pass the exam

- Understand the business value of Power Platform
- Describe capabilities and components of the Power Platform
- Create datasets, reports, and dashboards using Power BI
- Create simple Power Apps experiences (Canvas and Model-Driven apps)
- Automate basic business processes using Power Automate
- Create simple chatbots by using Power Virtual Agents

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Course Roadmap

Introduction

Environment

What to learn…

1. Describe the business value of Microsoft Power Platform
2. Identify the core components of Microsoft Power Platform
3. Demonstrate the capabilities of Power BI
4. Demonstrate the capabilities of Power Apps
5. Demonstrate the capabilities of Power Automate
6. Demonstrate the capabilities of Power Virtual Agents

How to learn it…

- Study notes
- Lectures
- Demo
- Application

How to prepare…

- Practice exams
- Focused tests

Conclusion

Bonus, next steps, and take the exam

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Power BI

What is it?	• Business intelligence and analytics service, that enables users to create reports and dashboards from data, to gain insights
Business value	• Take business data and allows you to display it in a way that makes sense (through data visualizations) • Create reports and dashboards quickly and easily (no coding required) that track and monitor KPIs • Enables fast informed decision-making – reports and dashboards usually replace meetings where KPIs are reported • Upload reports and dashboards to a shared website, create PDFs and send them out on a recurring or trigger basis
Other information	• Scalable – you can run Power BI for 1 person organization all the way to 100,000 person organization • Governance and security built-in • Pricing – contains a limited free version

Power Apps

What is it?	• Low-code development platform to create business applications
Business value	• Create customized business applications that streamline processes and that run on any device • Enables anyone (business users as opposed to developers) to quickly create value-adding applications through drag-and-drop, and low-code formulas (familiar to those who use Excel) • Contains connectors, and a scalable database service (Dataverse) to enable integration with data and other services
Other information	• Power Apps manages your app for you – version control, sharing permissions, device sizing, etc. • Pricing can be based on per user (all apps), or per user per app

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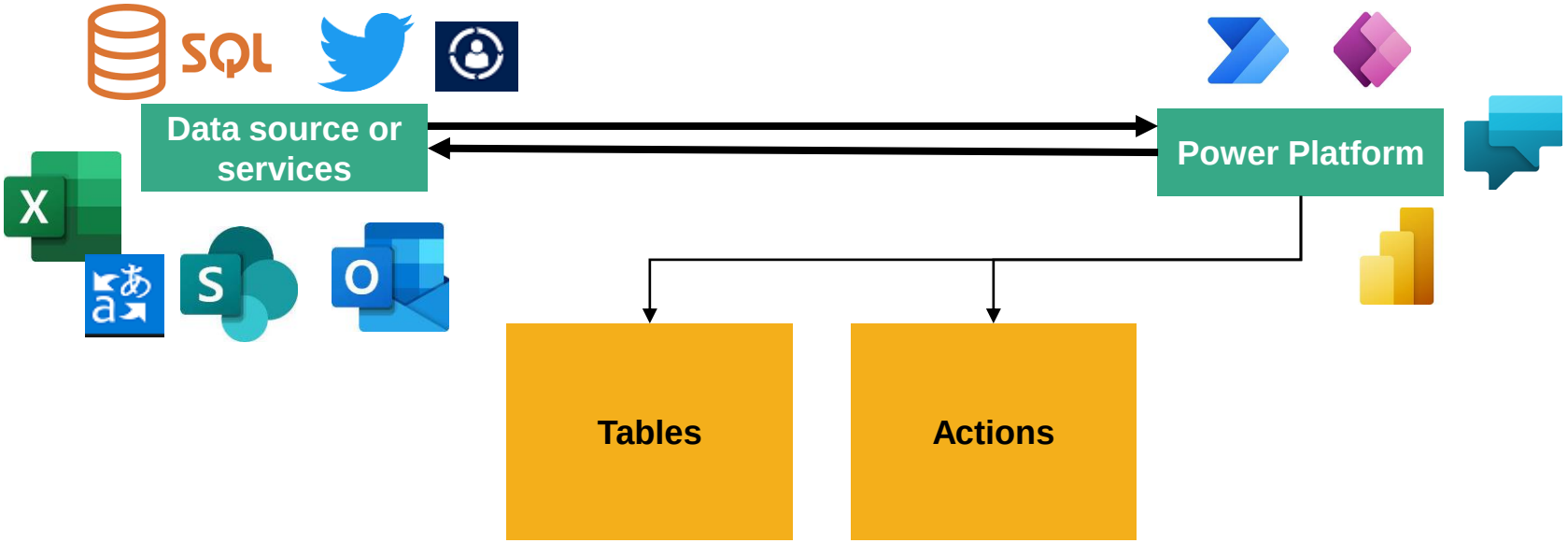
Power Automate

What is it?	• Automate and streamline your routine business processes
Business value	• Lets users create automated workflows – connecting different applications and services together • Workflows can be fully customized – triggered in any way, and can contain conditions, loops, approvals, and more • Workflows can be made very quickly and easily (low-code) • Workflows can use many different applications and services – through the use of connectors • Main use case for businesses is to save time on routine tasks, or streamline processes that have many different touchpoints
Other information	• Free to use (assuming you only use standard connectors) • Combine dynamic content, expressions, and formulas into your Power Automate flows to create more complex logic • Power Automate Cloud vs. Power Automate Desktop

Connectors



- Connectors are bridges, allowing you to access data and services across different applications
- There are more than 600 connectors with Power Platform

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Power Virtual Agents

What is it?	• Create powerful chatbots using guided, no-code GUI
Business value	• Create chatbots that you can deploy on your website, slack, Facebook Messenger, WhatsApp, and more • Create chatbots that interact with users to answer their basic questions (e.g., when does the store open?) • Create chat diagrams and conditions, that takes them on a guided journey based on their responses • Call automated workflows based on user responses • Create chatbots with no code, and start from importing an FAQ page
Other information	• No need for any conversational data science – responses that are similar (“yes”, “sure”, “let’s do it”) are treated together • Walk through the path that your users travel through

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Dynamics 365

What is it?	• Off-the-shelf intelligent business applications from Microsoft, that connect data, processes, and teams together
Different applications (12 total)	• Dynamics 365 Sales – Sales Leaders, Sales Operations • Dynamics 365 Customer Service – Customer Service Leaders, Customer Service Operations • Dynamics 365 Field Service – Field Service Leaders, Field Service Operations • Dynamics 365 Human Resource – Attract, Onboard, Core HR • Dynamics 365 Finance & Operations – Finance and Ops Leaders • Dynamics 365 Supply Chain Management - Streamline planning, production, stock, warehouse, and transportation. • Dynamics 365 Commerce • Dynamics 365 Project Service Automation – Operation Leaders, Project Leaders • Dynamics 365 Marketing—Adobe Marketing Cloud, Marketing • Dynamics 365 Artificial Intelligence – AI for Sales, AI for Customer Service, AI for Market Insight • Dynamics 365 Mixed Reality – Remote Assist, Layout, Guides • Dynamics 365 Business Central – ERP for SMBs

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D 365 + Power Platform

Dataverse

- The data within most Dynamics 365 apps is actually stored in Dataverse
- Dataverse works and integrates very well with Power Platform
- Use Power Apps to create apps from data within D365
- Use Power Automate to create flows based on updated data in D365
- Use Power BI to analyse data in D365

Relevant connectors

- Power Platform also has connectors that bridge directly to some D365 apps (Business Central, Customer Insights, Finance and Operations, SCM)
- Use Power Automate to create flows where the trigger is “when a business event occurs”
- Use Power Apps to cause D365 actions

Data sources

- With Power BI, you can select Dynamics Business Central and Customer Insights as “data sources”, that you can then analyze and create reports / dashboards

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Microsoft 365

What is it?

- Subscription service to common business and office productivity applications, like Excel, Outlook, PowerPoint, etc.

Subscriptions

- OneDrive For Business
- Skype for Business
- Word
- Excel
- PowerPoint
- OneNote
- Outlook
- Publisher
- Access
- Yammer
- SharePoint
- Exchange
- Forms
- Etc.

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M 365 + Power Platform

Connectors

Data sources

- Use SharePoint Lists as a database for your Power Apps application
- Create a flow that emails you when a new record is added to a SharePoint online file
- Create a Power App that enables users to add, edit, modify, and delete records from an Access database
- Create a Power BI dashboard from data that exists in Access and in SharePoint Lists

Services (actions and triggers)

- Trigger a Power Automate workflow when someone submits a new form in Microsoft Forms, that emails the record to your manager
- When an email with file attachment is received, put attachment into OneDrive
- Create a Power App that lists tasks from Microsoft To Do and allows you to assign tasks to other people

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Teams & Power Platform

- Embed Power App (Canvas or Model Driven) into Teams as a tab or personal app
- Create apps directly within Teams, using Dataverse for Teams

- Create workflows that trigger based on Teams messages or adaptive cards
- Create workflows that send Teams messages or create new chats

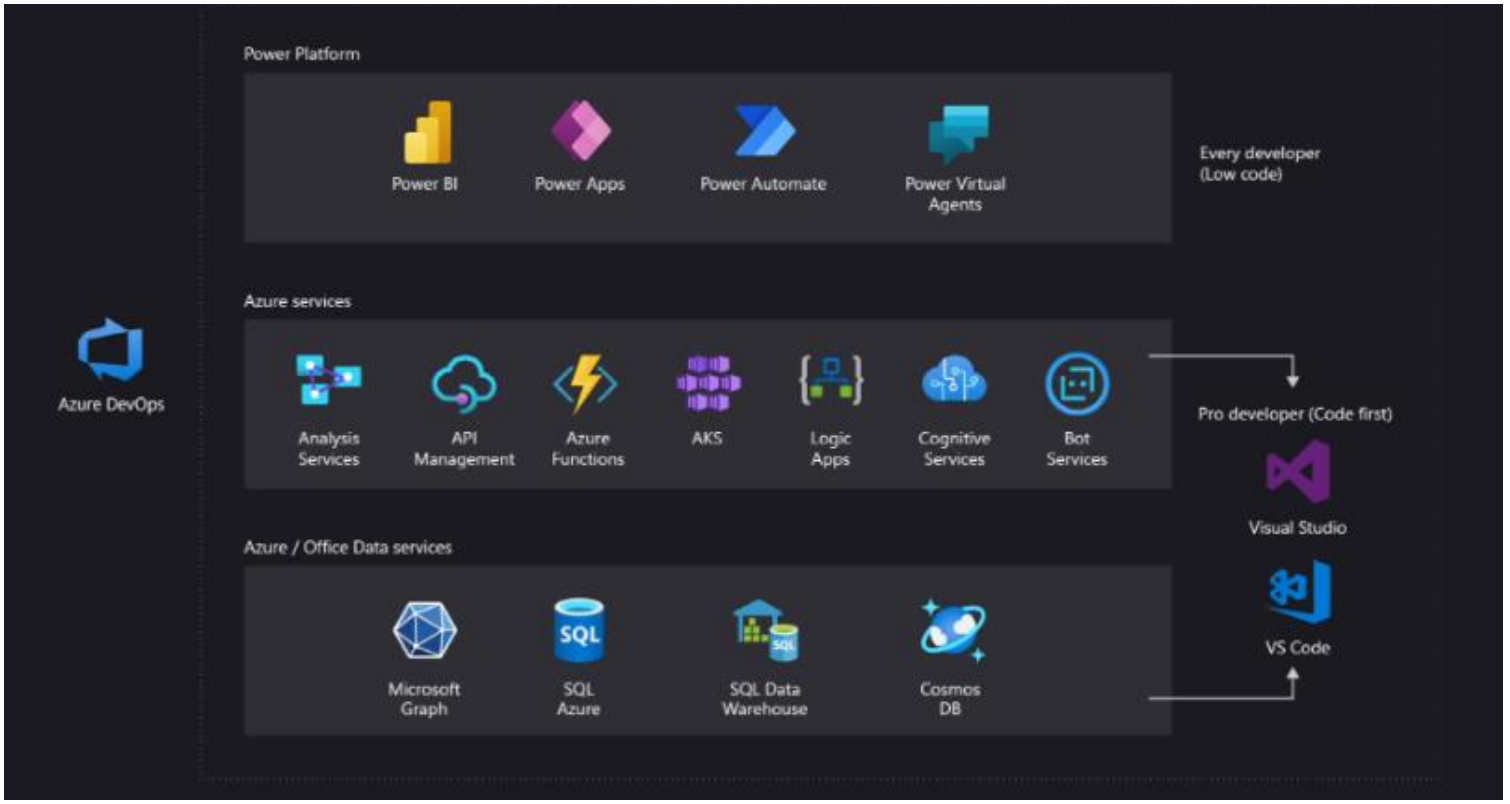
- Add Power BI app directly into Teams
- Embed interactive report in Teams channels and chats

- Deploy chatbots on Teams, for your employees or team members to use

Microsoft Azure

What is it?

- Cloud computing service, providing software-as-a-service, platform-as-a-service, infrastructure-as-a-service and many other resources



Microsoft Azure

What is it?

- Cloud computing service, providing software-as-a-service, platform-as-a-service, infrastructure-as-a-service and many resources

Popular services to know about

- Analysis services
- API management
- Azure Functions
- Azure Kubernetes Services
- Logic Apps
- Cognitive Services
- Bot Services

- Azure AD
- Azure CDN
- Azure Data Factory
- Azure Blob Storage
- Azure SQL
- CosmosDB

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Azure + Power Platform

Connectors

Data sources

- Use Power BI to run analytics, create reports, and create dashboards from
  - Azure SQL databases
  - Azure Cosmos DB
  - Azure Analytics Services DB
  - Azure Blob storage
- Create apps from
  - Azure File Storage
  - Azure Log Analytics

Services (actions and triggers)

- Employ cognitive services in your Power Apps, like computer vision, text to speech, language conversion, and more
- Use Azure Bot Service and Power Virtual Agents to create bots in multiple languages and dialects
- Use Power Automate and Azure Functions to create workflows that call third-party APIs, like independent software or software without connectors
- Connect Power Automate to Azure Data Factory, and mix process workflows with data workflows

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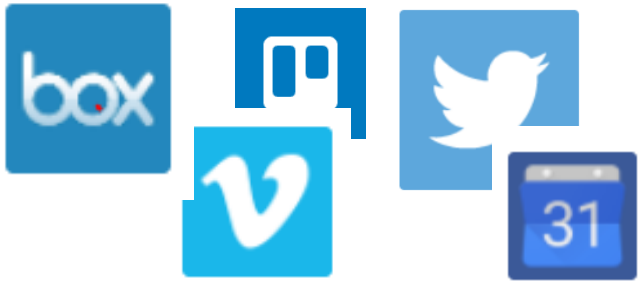
Third Party Apps / Services and Power Platform

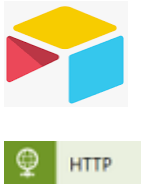
Standard / premium connectors

- The first step is to see if the third-party application has a standard / premium connector within Power Platform
- Most popular applications have Power Platform connectors already (there's over 600)



HTTP requests / API calls

- If a connector does not exist, you can use HTTP requests to communicate with the third party app's API, to either receive data or process an action



Create custom connector

- If you find that you are using HTTP requests a lot for the same third party application, consider creating your own custom connector
- This can be done in 3 ways: OpenAPI, Postman, or "blank approach" method)

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Microsoft AppSource

What is it?

- Online store that contains thousands of business applications and services built by industry-leading software providers
- Includes SaaS built for Azure, Dynamics 365, Power BI, Power Apps, and consulting services
- Three types: **Apps**, **Consulting Services** (assessments, implementations, etc. for Microsoft solutions), **Partners** (people who can transform your organization)

Why?

- Certification
- Security
- Rating and
- Action-taking (Get It Now, Test Drive, Free Trial, Contact Me)

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How Power Platform Works Together

Power Apps

Power Automate

Power BI

Power VA

Connectors

AI Builder

Dataverse

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How Power Platform Works Together

Power Apps

Power Automate

Power BI

Power VA

All Power Platform apps use connectors to connect to other applications, and can use Dataverse as their underlying data source

Connectors

AI Builder

Dataverse

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How Power Platform Works Together

Power Apps

Power Automate

Power BI

Power VA

Power Apps can trigger workflows in Power Automate, and then send information back to Power Apps (e.g., select expense record and send Teams message)

Connectors

AI Builder

Dataverse

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How Power Platform Works Together

Power Apps

Power Automate

Power BI

Power VA

You can filter to specific data in Power BI, and then create a workflow that runs on each record (e.g., select users and send an email to each user)

Connectors

AI Builder

Dataverse

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How Power Platform Works Together

Power Apps

Power Automate

Power BI

Power VA

Power VA can trigger Power Automate workflows)e.g., if user asks to speak to agent, an email with customer details is sent to agents)

Connectors

AI Builder

Dataverse

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How Power Platform Works Together

Power BI dashboard tiles can be viewed in Power Apps; Power Apps can be embedded in Power BI reports

Connectors

AI Builder

Dataverse

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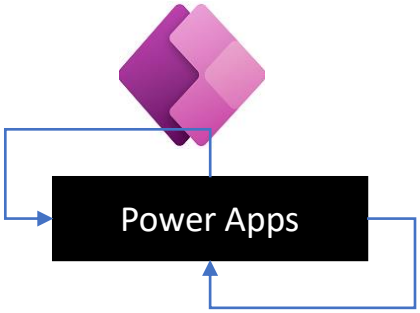
How Power Platform Works Together



Power Apps

Power Automate

Power BI

Power VA

Power Apps canvas apps can be viewed in Model Driven Apps

Connectors

AI Builder

Dataverse

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Power Platform Security

Why do we care?

- Power platform puts data, connectors, apps in the power of everyone's hands (i.e., it democratizes it)
- This can pose security concerns as these "makers" are creating apps and accessing data, but may not have relevant security training
- How do organizations balance innovation and increased productivity with risks and data exposures? They do it through robust security

Dataverse Security Roles (DSR)

Azure Identity Services (Azure AD)

Identitiy Access Management (IAM)

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Dataverse Security Roles

Key concepts

- Each environment has 1 Dataverse database, and its own security profiles
- **Security roles:** a set of privileges, permissions, and actions that a user can perform
- Security is managed by adding users to the environment, and then assigning them, or teams of users, to **security roles**
- Built-in general DEFAULT environment-level security roles are…

System Administrator Role

- Add/remove/customize users from different security roles
- Provision Dataverse database for an environment
- View and manage all resources that are created in an environment
- Set data loss prevention policies (DLPs)

Environment Maker Role

- Create apps, workflows, reports, connectors, etc.
- Distribute and share apps, workflows, reports to all users in an organization
- When a new user is added to environment, they get the Dataverse User and Environment Maker role

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User Security Roles (1/2)

Security role	Database privileges*	Description
Environment Admin	Create, Read, Write, Delete, Customizations, Security Roles	The Environment Admin role can perform all administrative actions on an environment, including the following: • Add or remove a user from either the Environment Admin or Environment Maker role. • Provision a Dataverse database for the environment. After a database is provisioned, the System Customizer role should also be assigned to an Environment Admin to give them access to the environment's data. • View and manage all resources created within an environment. • Set data loss prevention policies.
Environment Maker	Customizations	Can create new resources associated with an environment, including apps, connections, custom APIs, gateways, and flows using Microsoft Power Automate. However, this role doesn't have any privileges to access data within an environment. More information: Environments overview
System Administrator	Create, Read, Write, Delete, Customizations, Security Roles	Has full permission to customize or administer the environment, including creating, modifying, and assigning security roles. Can view all data in the environment. More information: Privileges required for customization

https://docs.microsoft.com/en-us/learn/modules/get-started-security-roles/4a-security-role

User Security Roles (2/2)

System Customizer	Create (self), Read (self), Write (self), Delete (self), Customizations	Has full permission to customize the environment. However, users with this role can only view records for environment entities that they create. More information: Privileges required for customization
Basic User	Read (self), Create (self), Write (self), Delete (self)	Can run an app within the environment and perform common tasks for the records that they own. This only applies to non-custom entities.
Delegate	Act on behalf of another user	Allows code to *impersonate*, or run as another user. Typically used with another security role to allow access to records. More information: Impersonate another user
Support User	Read Customizations, Read Business Management settings	Has full Read permission to customization and business management settings to allow Support staff to troubleshoot environment configuration issues. Does not have access to core records.

https://docs.microsoft.com/en-us/learn/modules/get-started-security-roles/4a-security-role

Environments

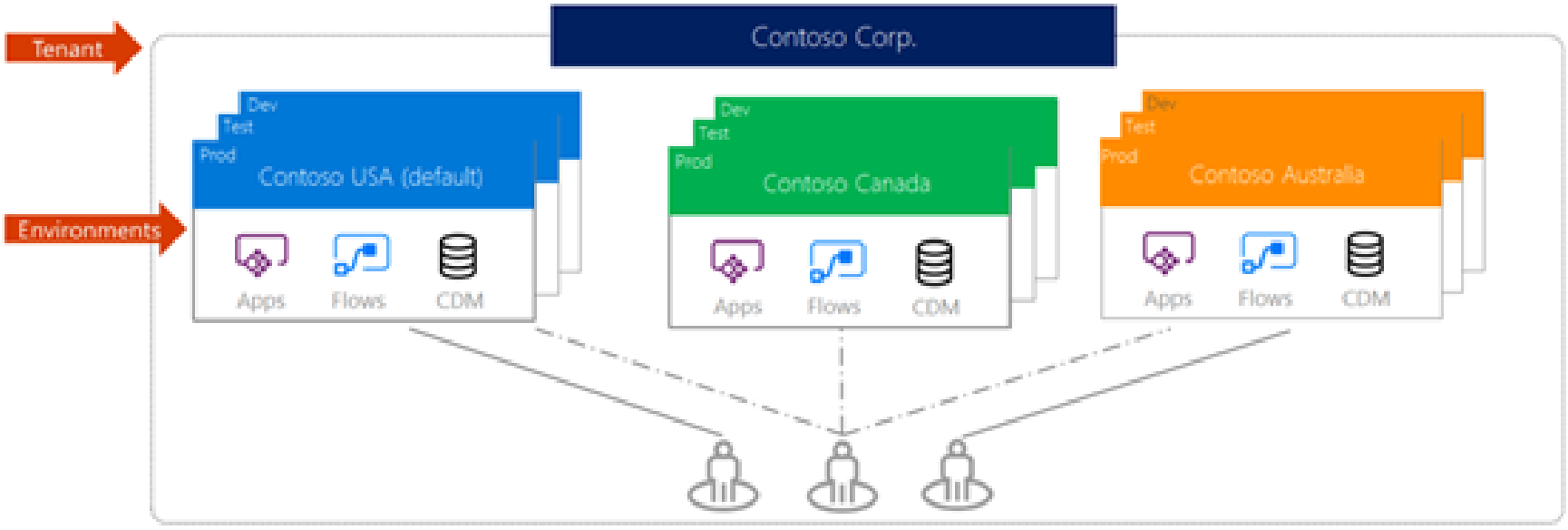
What and why?

- Environments are “fenced off” regions of the Power Platform
- Each environment has its
  - own instance of Microsoft Dataverse
  - Its own set of Power Apps and Power Automate flows
  - Its own settings on security, data policy, and user access
  - Language, currency settings
- Each environment must be created under a Azure Active Directory (Azure AD) tenant – with its resources only used by users within that tenant
- Each environment is bound to a specific geographic location
- A default environment is already set up for you when you sign up for Power Apps, or if you have a M365 account with Microsoft

Other information

- Multiple environments are set up to…
  - Manage solution development (dev, test, prod)
  - Manage different parts of the business
  - Manage different brands / geographies of the business

Environments



https://docs.microsoft.com/en-us/learn/modules/create-manage-environments/1-intro

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Admin Centers

Microsoft 365 Admin Center

- Create users to your organization
- Assign and manage licenses
- Manage users (change passwords, block access, etc.)
- Create groups and roles
- Purchase products and licenses
- Billing and support
- Org Settings

Microsoft Power Platform Admin Center

- Environment management (create new environments, add users, create and assign security roles, change environment settings, data management, encryption, audit)
- Analytics on usage, API calls, etc.
- Data integration and monitoring
- Policies (data policies, billing policies, etc.)
- Help and support

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Data Loss Prevention

What and why?

- Your organization's data is very important; building apps and flows is also important; however, there is a risk that data may be exposed to leaks while your users build apps and flows
- For example, if you create a flow between Twitter / Facebook and SharePoint Lists, you may accidentally leak data to social networks
- DLPs are policies that acts as guardrails to prevent users from unintentionally exposing data

How it works

- DLPs involve creating policies where you classify connectors into 2 business groups(**Business, Non-Business),** or **Blocked**
- **Connectors** in the same business group can interact with each other; connectors in different business groups cannot interact with each other; connectors in the Blocked group cannot be used at all

Other information

- Connectors can only be in one business group at a time
- DLPs can be enforced at the tenant or environment level
- If they are enforced at the tenant level, they can be defined for all environments, selected environments, or all but selected

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Data Loss Prevention Examples

Tenant level -- all environments except for Dev

Business	Non-Business	Blocked
• Dataverse • SharePoint • Trello	• Outlook • Teams	• Facebook • Twitter

- What you can do
  - Power Apps / Automate with DataVerse and SharePoint
  - Power Apps / Automate with Outlook and Teams
  - Power Apps / Automate with Trello and SharePoint

- What you cannot do
  - Power Apps / Automate with Outlook and Trello
  - Power Apps / Automate with Outlook and Facebook
  - Power Apps / Automate with Facebook and Microsoft To Do
  - Power Apps / Automate with Outlook and Microsoft To Do

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Data Loss Prevention Blocked Exceptions

The following connectors can't be blocked by using DLP policies.

Microsoft Enterprise Plan standard connectors	Core Power Platform connectors
Defender for Cloud Apps	Approvals
Dynamics 365 Customer Voice	Notifications
Excel Online (Business)	Dataverse
Kaizala	Dataverse (current environment)
Microsoft 365 Groups	Power Apps Notifications (v1 and v2)
Microsoft 365 Groups Mail (Preview)	
Microsoft 365 Outlook	
Microsoft 365 Users	
Microsoft Teams	
Microsoft To-Do (Business)	
OneDrive for Business	
OneNote (Business)	
Planner	
Power BI	
SharePoint	
Shifts	
Skype for Business Online	
Yammer	

https://docs.microsoft.com/en-us/power-platform/admin/dlp-connector-classification

Privacy Guidelines

Compliance	Microsoft offers the most comprehensive set of compliance offerings (including certifications and attestations) of any cloud service provider
Data Residency	When creating a new environment, Microsoft enables you to choose where (what geography) to create that environment in
Data Security	Data in transit is always secure and encrypted, including all public endpoints and APIs, with TLS 1.2 (or higher) Dataverse uses SQL Server Transparent Data Encryption (TDE) Encryption keys are managed by Microsoft, but can also be self-managed
GDPR compliant	Microsoft contains tools to ensure that you are GDPR compliant, including responding to Data Subject Rights (DSR) requests
Audit Logs	Compliance centre includes audit logs for Dataverse, Power Automate, and Power Apps

Accessibility Guidelines

Accessibility Checker	Microsoft provides tools to ensure that your Canvas and Portals Apps are accessible – it finds not only accessibility issues, but also why each might be a potential problem for users who have a disability
Accessibility Resources	Microsoft contains several resources to help you create accessible applications

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Privacy and Accessibility Tools

- Trust Center
- Documentation
- M365 Security and Compliance Center
- Admin centres
- Accessibility Checker
- Accessibility Resources
- Windows Tools

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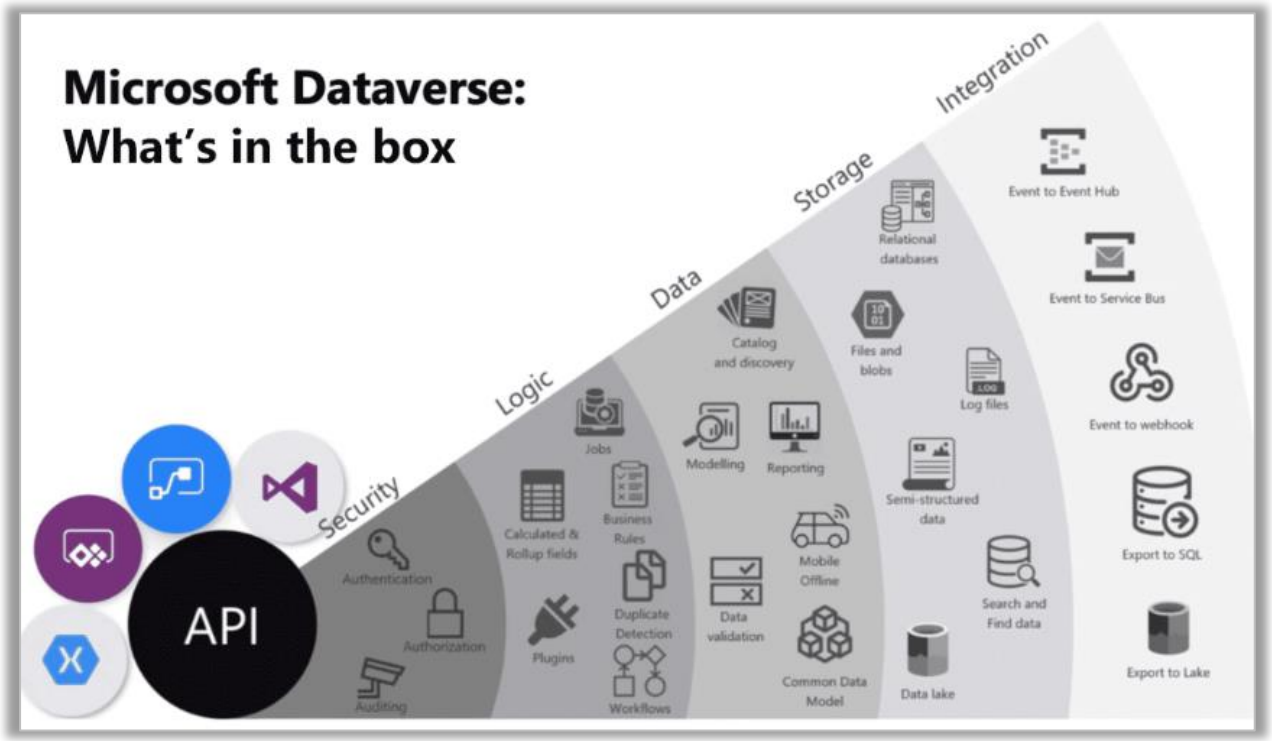
Governance

Architecture	Security	Alert & Action	Monitor
• Environments keep data and security around a container (separate silos), and enable development • All resources used by Power Apps, Power Automate, and Dataverse exist in an environment	• Licensing enables you to control who can access Power Apps and other Power Platforms • Environments, network access policies, DLPs also help with security • Power Apps / Automate do not provide extra access to underlying data	• Power Automate can be used to automate actions and alerts • Alerts on Power Virtual Agents • PowerShell policies	• Activity logging for Power Apps keeps an audit trail • Get a licensing report to see what licenses and accesses your users have

Dataverse

What is it?

- Cloud-based database solution – the central data repository for your business data, powering many different applications and workflows



https://docs.microsoft.com/en-us/learn/modules/introduction-common-data-service/2-overview?ns-enrollment-type=learningpath&ns-enrollment-id=learn-dynamics.get-started-using-common-data-service

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Dataverse vs. Standard Database

Similarities	Differences
• Both store information in tables, through rows and columns • Both enable you to stream in data and create workflows that modify data • Both contain security that limits access to data in the database • Can be used to populate business applications with the Power Platform	• **Integration with Dynamics 365** – D365 uses Dataverse as its underlying database • **Cloud management and storage** – everything is stored in the cloud, which means it's always available and scalable • **Field types, metadata, validation** – fields are defined by their types, enabling validation and logic • **Logic field and business rules** – create business rules and logic between fields • **Role-based Security** – access data based on each person's security settings, for each field • **Relationships** – tie one table to another using LookUp columns • **Common data model** (see next page)

Common Data Model

Common Data Model

- Dataverse employs the Common Data Model, which is a set of pre-defined tables, columns, and relationships commonly found across all organizations
- It basically allows you to build a database, but you don't have to start from scratch
- For example, Dataverse comes with the following already built-in, which many companies already have:
  - an Account table and Contact table
  - Fields like name, address, phone number, etc. in both table
  - A 1:M relationship between Accounts and Contacts, where there's a 1:M relationship between Accounts and Contacts

Other notes

- A Dataverse database is a single instance of Dataverse; each environment can only contain one instance of Dataverse
- Dataverse is scalable – it can contains complex data models and large data sets (millions of items)

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Dataverse For Teams

What is it?

- A smaller limited targeted instance of Dataverse that runs within Teams environment, and supports Teams-based applications

How is it different than Dataverse?

- **Table features are limited in Teams:** Teams does not support advanced data fields. Common data model, logs, data lakes, offline support. It still, however, has relational storage, basic data types, and file / image support
- **Management is limited.** Dataverse for Teams is used solely to manage the data in Teams applications, and so does not have API access to the data, plug-ins, Power Apps standard framework, or paginated reports. You can still perform data visualization features though in Dataverse for Teams
- **Environment is limited:** With Dataverse for Teams, only 1 environment is made per team, and is destroyed when team is deleted. It's size is maximum 2GB (compared to Dataverse which is 4TB or more)

Dataverse For Teams

How is it different than Dataverse?

- **Security:** Dataverse for Teams does have admin and user roles, but does not have any activity logging, auditing, field-level security, hierarchical security, or record sharing – and only has one business unit that can be used
- **Integration:** Both Dataverse and Dataverse for Teams support 350+ standard and premium connectors, and both supports Power Automate. However, Dataverse For Teams does not support: Azure Synapse, Data Export Sevice, Events to Azure, Webhooks, Servier-side sync, connectors to SQL Servier Management Studio
- Great resource: https://docs.microsoft.com/en-us/power-apps/teams/compare-data-sources

Dataverse elements

Tables	• Logical structure containing rows and columns, that represents a set of data – each table should be about one “thing” (Account, Contacts, etc.) • 3 types: standard, managed, custom
Columns	• Stores discrete pieces of information within a row in a table • Columns have data types – the information that is stored in a column *must* match the data type of the column
Relationships	• Relational connection that one or more tables have together (i.e., how different tables in a database are tied together) – you can think about the relationship between Accounts and Contacts (1:M), or Classes and Students (M:M), or Students and Locker (1:1)

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Tables

Management

- **Standard**: out-of-the-box tables, included with the Common Data Model; most are customizable
- **Managed**: Imported as part of a managed solution; not customizable
- **Custom**: Imported from unmanaged solution, or created directly in environment

Table Ownership

- Once a table is created, its ownership status cannot be changed
- **Organization:** data belongs to org; access is controlled at org. level
- **User or Team:** data belongs to user / team; actions can be controlled at user level

Special Tables

- **Activity** tables
  - Special kind of table that can only be owned by user or team, instead of an entire organization; it must also have time dimensions, and status (open, completed, etc.)
  - Examples are: Appointment, Email, Fax, Letter, Phone Call, Task
- **Virtual** tables
  - Custom table that has columns from external data sources

Columns

Types

- https://docs.microsoft.com/en-us/power-apps/maker/data-platform/types-of-fields

Relationships

Types

- How rows from different tables are tied together; very common in all database systems
- We have relationships to avoid storing repetitive data, supporting huge rows with large amounts of blank data, easier reporting, and enabling an efficient solution that will scale while maintaining high performance

Example of a 1:M relationship (also known as parent-child)

Primary key

Foreign key

Related table

Invoice ID	Invoice Date	Customer ID	Invoice Amount
1	2022-06-01	1	20
2	2022-06-05	2	30
3	2022-06-12	1	20
4	2022-06-13	1	40
5	2022-06-19	2	50

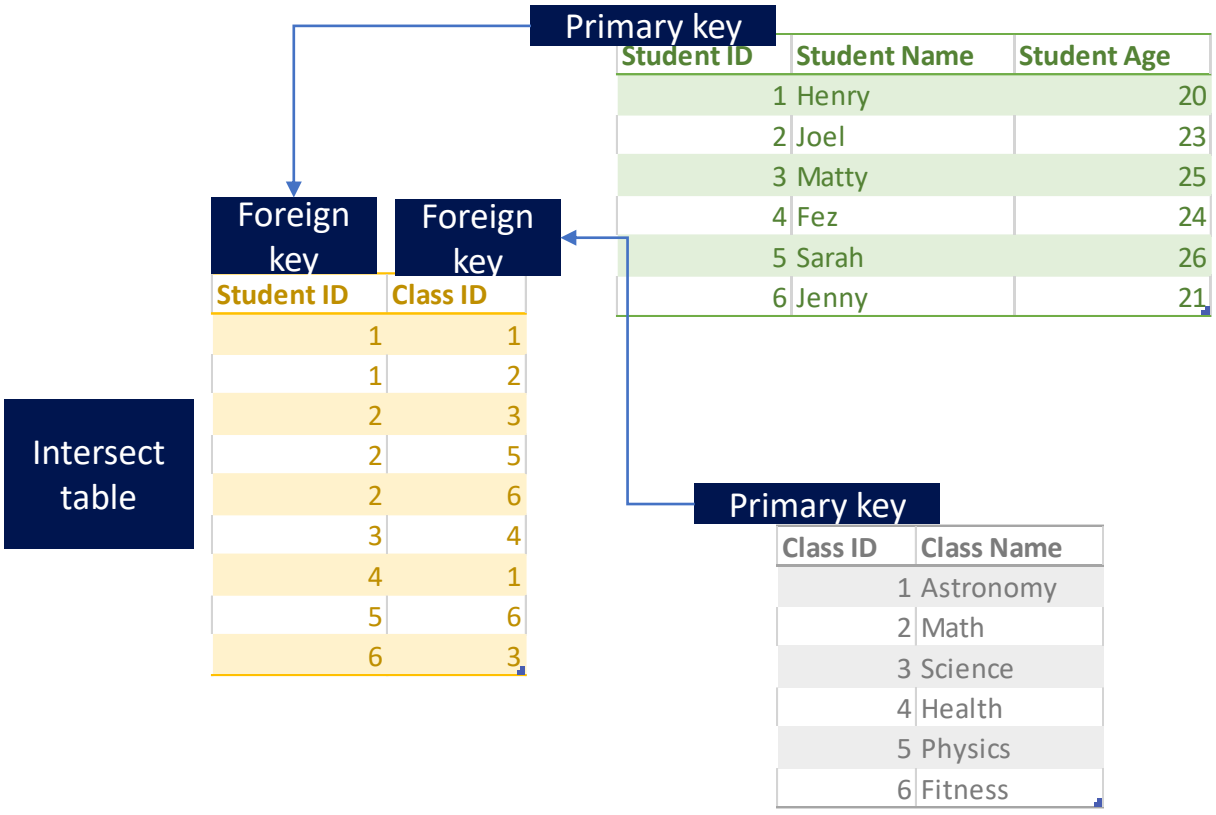
Primary table

Customer ID	Customer Name	Customer Address	Customer Phone Number
1	Apple Inc	California	555-9851
2	Microsoft Corp	Seattle	555-4125

Primary key

Relationships

Example of a M:M relationship

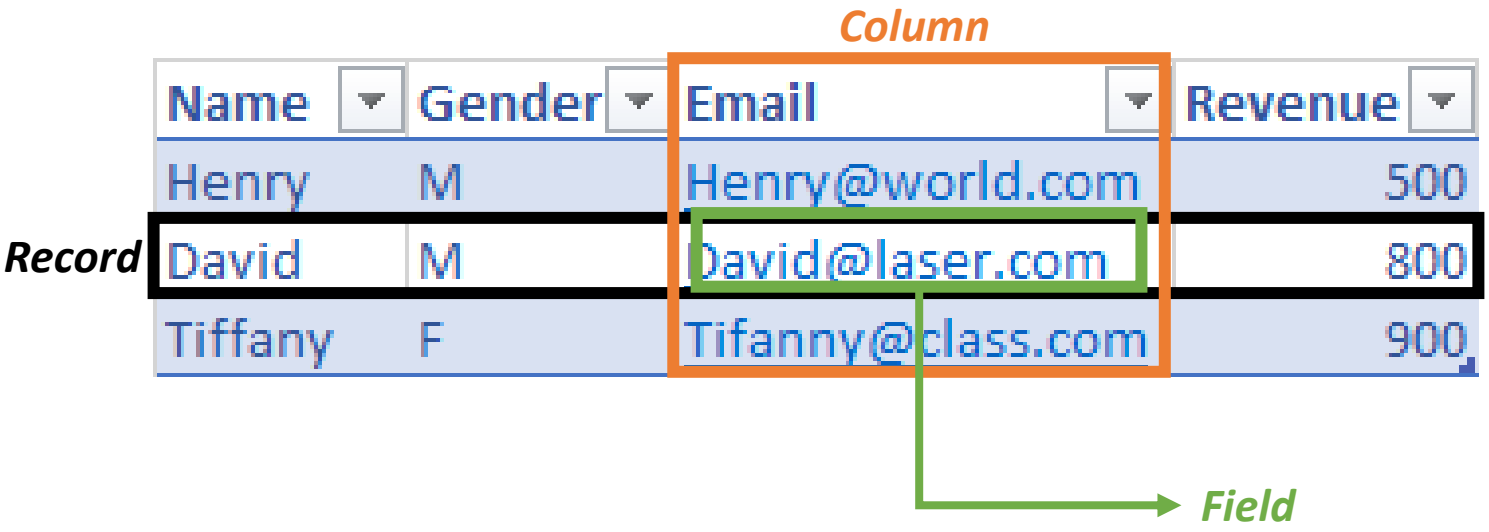


Student ID	Student Name	Student Age
1	Henry	20
2	Joel	23
3	Matty	25
4	Fez	24
5	Sarah	26
6	Jenny	21

Student ID	Class ID
1	1
1	2
2	3
2	5
2	6
3	4
4	1
5	6
6	3

Class ID	Class Name
1	Astronomy
2	Math
3	Science
4	Health
5	Physics
6	Fitness

Dataverse elements



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Common Data Model

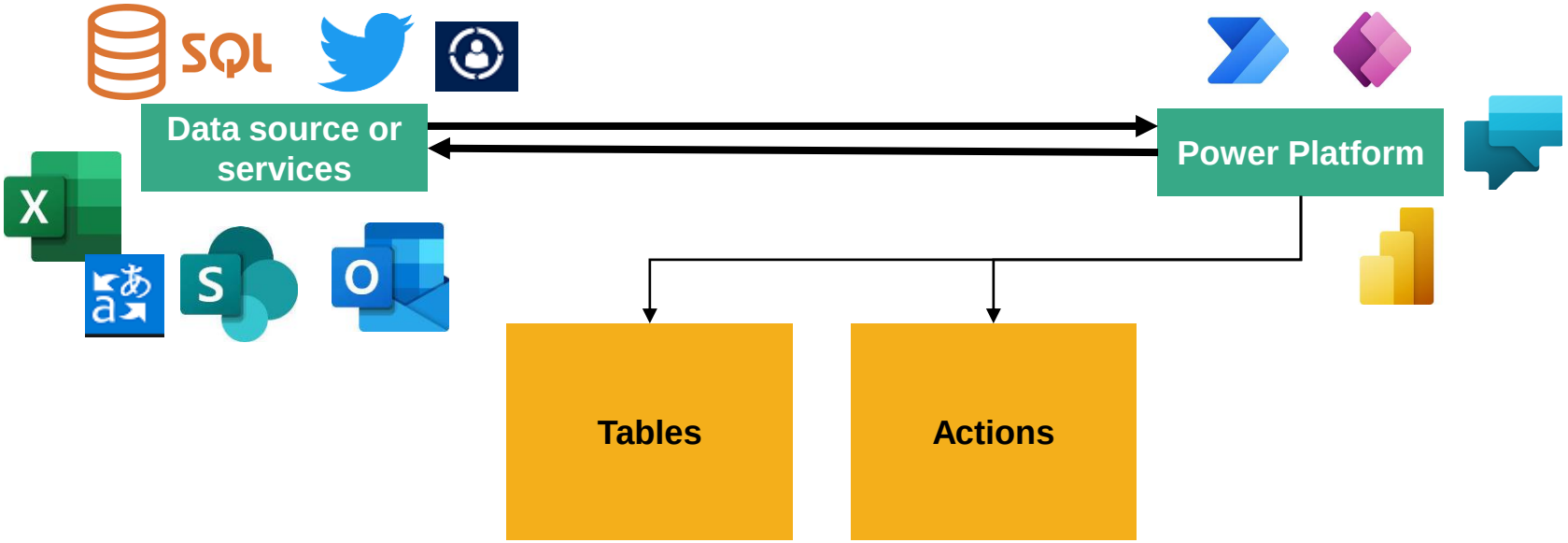
Common Data Model

- Dataverse employs the Common Data Model, which is a set of pre-defined tables, columns, and relationships commonly found across all organizations

Advantages

- Common tables already are used to describe people, places, and things
- Standardized using the Open Data Initiative, and so if you interact with any other platforms that also use CDM, it is really easy to integrate with Dataverse
- Simple – all relationships are already defined for you
- Scalable

Connectors



- Connectors are bridges, allowing you to access data and services across different applications
- There are more than 600 connectors with Power Platform

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Connectors, Triggers, Actions

Connectors

- Bridge from your workflow to an application, which allows Power Automate to receive and send information and actions
- This allows you to access data, send actions, and receive triggers across different platforms
- 600 connectors

Triggers

- Starts a flow
- Could be a event-based, instant, or time-based

Actions

- Functionality that is executed on the connector
- Email → send an email
- Twitter → Send a tweet
- SharePoint List → access records and add new row

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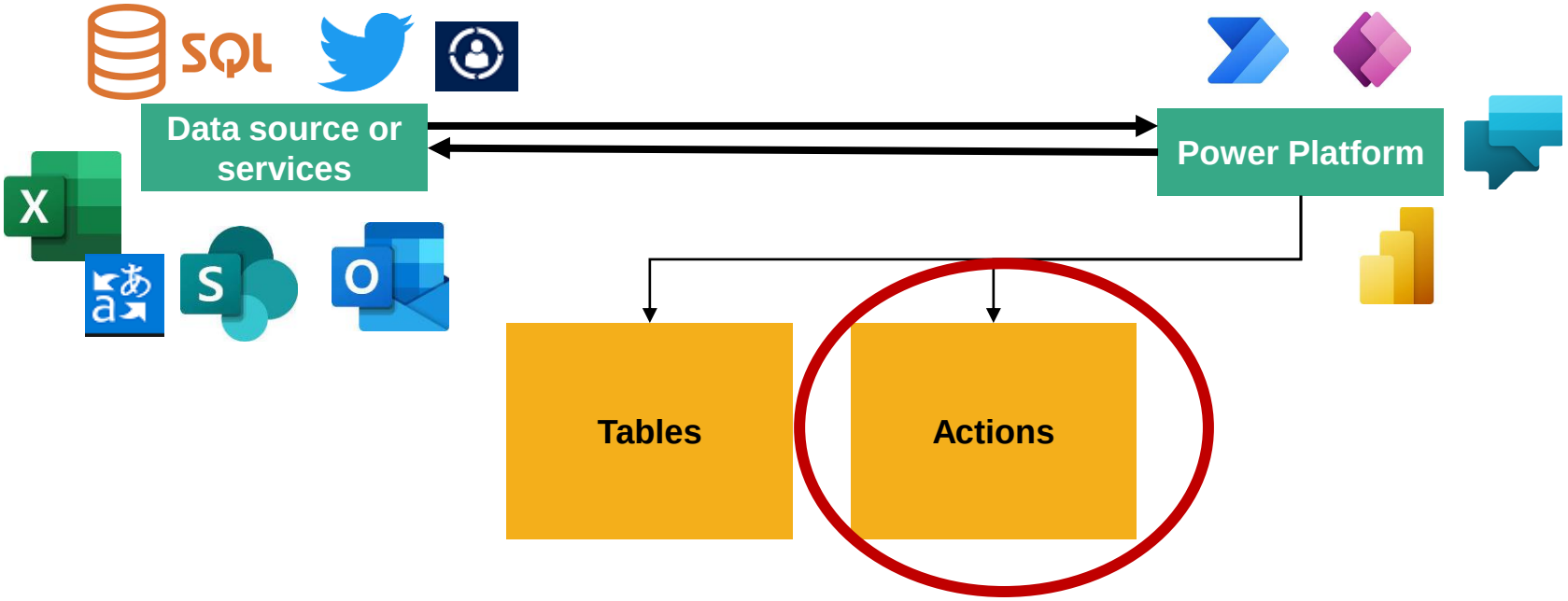
Trigger Types

Action-based	Time-based	Click-based
Based on an event occurring on another application	***Based on passage of time***	***Through button click***
• New item on SharePoint list • Tweet sent • Email received	• Once every hour • Once every month on the 1st • Every Monday and Friday	• Button on Power Automate • Button on Power Apps • Button on custom website through HTTP

Triggers can only be used in Power Automate

Actions



- Used in both Power Apps and Power Automate
- Functionality is executed on the Connector:
  - Twitter → send a tweet
  - SharePoint → add new record
  - Outlook → send an email
  - Microsoft Translate → translate the word “hello” to Spanish

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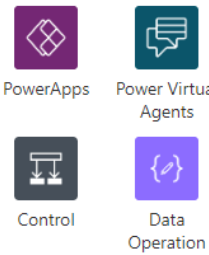
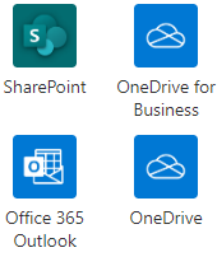
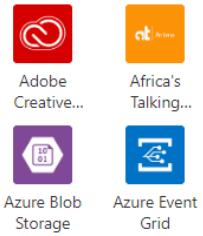
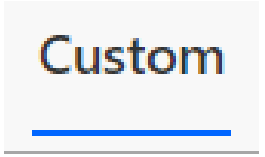
Types of Connectors

Built-in	Standard	Premium	Custom
Provides Power Automate specific actions, used to control flows, create expressions, and user-based triggers	Popular connectors that you do not need additional licensing for	App-based connectors where additional licensing or payment is required	Connectors you build yourself that works with another app's API









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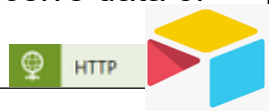
Use Case of Custom Connectors

Standard / premium connectors

- The first step is to see if the third-party application has a standard / premium connector within Power Platform
- Most popular applications have Power Platform connectors already (there's over 600

HTTP requests / API calls

- If a connector does not exist, you can use HTTP requests to communicate with the third party app's API, to either receive data or process an action



Create custom connector

- If you find that you are using HTTP requests a lot for the same third party application, consider creating your own custom connector
- This can be done in 3 ways: OpenAPI, Postman, or "blank approach" method)
- Can be used in Power Apps or Power Automate
- Custom connectors can be shared with others in your organization, and to the public (if certified by Microsoft)

AI Builder

What is it?

- Bring sophisticated AI to your business via the Power Platform (Power Apps and Power Automate only) without writing any code or knowing any math

- With AI builder, you create models to do different things, like:
  - Analyze text for language, and sentiment.
  - Predict whether something will happen.
  - Process business card information and text from images.
  - Read and save information from standard documents

- AI models are deployed with the following steps:
  1. Choose model (pre-build or custom)
  2. Connect data, tailor, train, and publish model (assuming custom)
  3. Deploy model directly, through Power Apps, or through Power Automate

Model types

- Pre-built: Models that do not require training and can be used right away (e.g., business card reader, sentiment analysis)

- Custom: Models that need to be tailored, trained, and deployed before they can be used (e.g., document processing, object detection, prediction, category classification)

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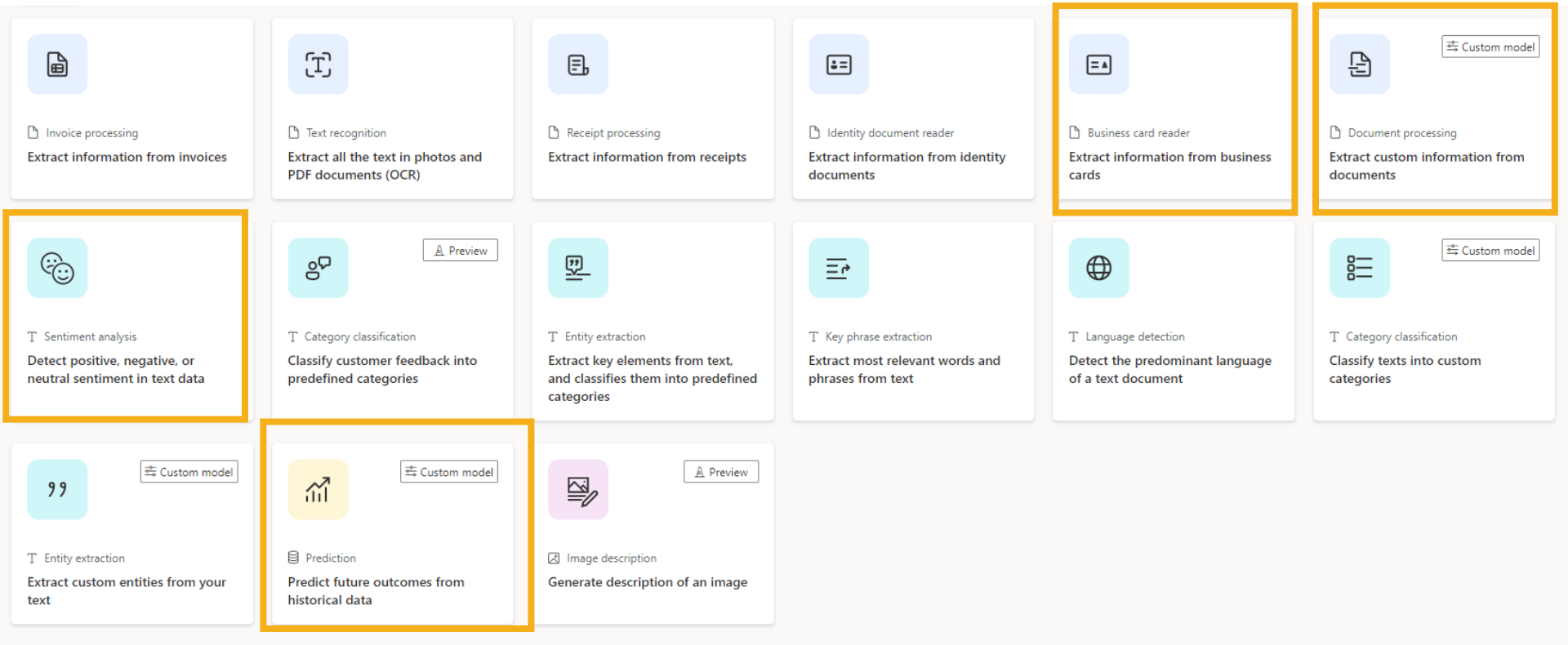
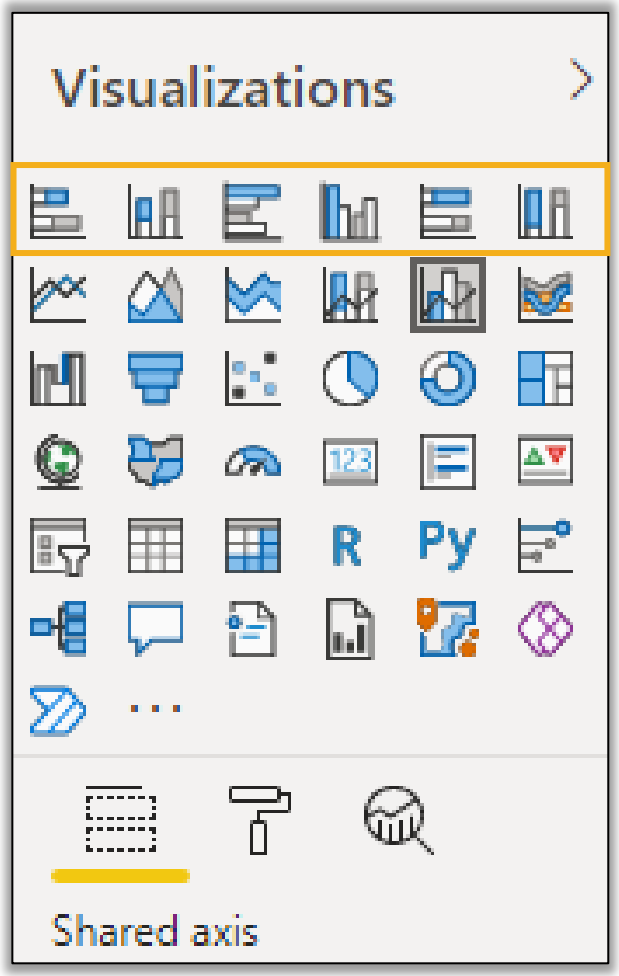
AI Builder Models



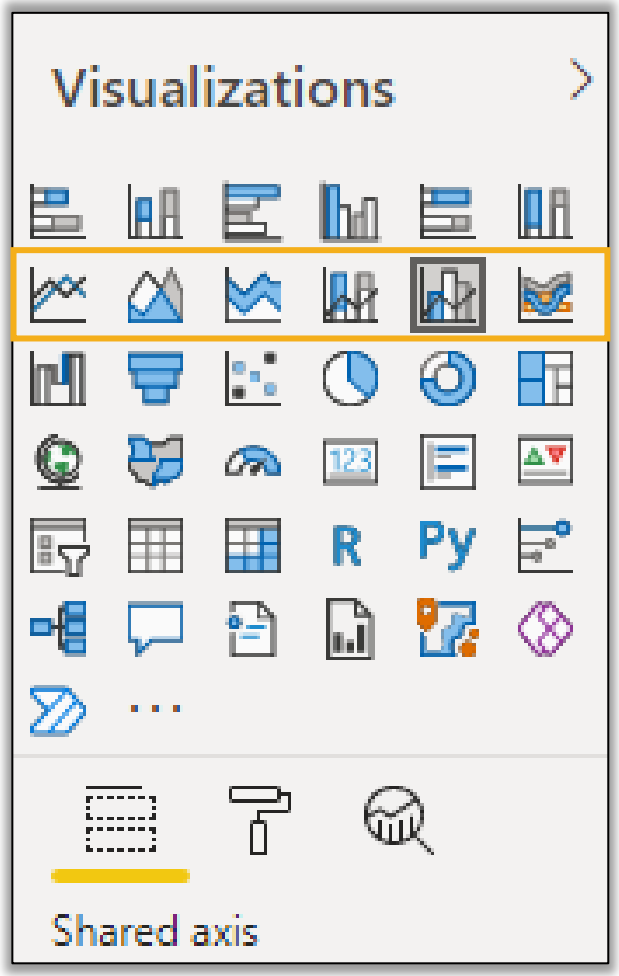
Visualization options



- **Stacked bar chart & Stacked column chart** – useful to look at metric across different categories and legends, where values across legends naturally add up
- **Clustered bar chart and clustered column chart** – useful to look at metric across different categories and legends, where values across legends naturally do not add up
- **100% stacked bar chart & 100% stacked column chart** – useful to look at metric across different categories and legends, where the distribution / composition of the legends matter

https://docs.microsoft.com/en-us/power-bi/visuals/power-bi-visualization-types-for-reports-and-q-and-a

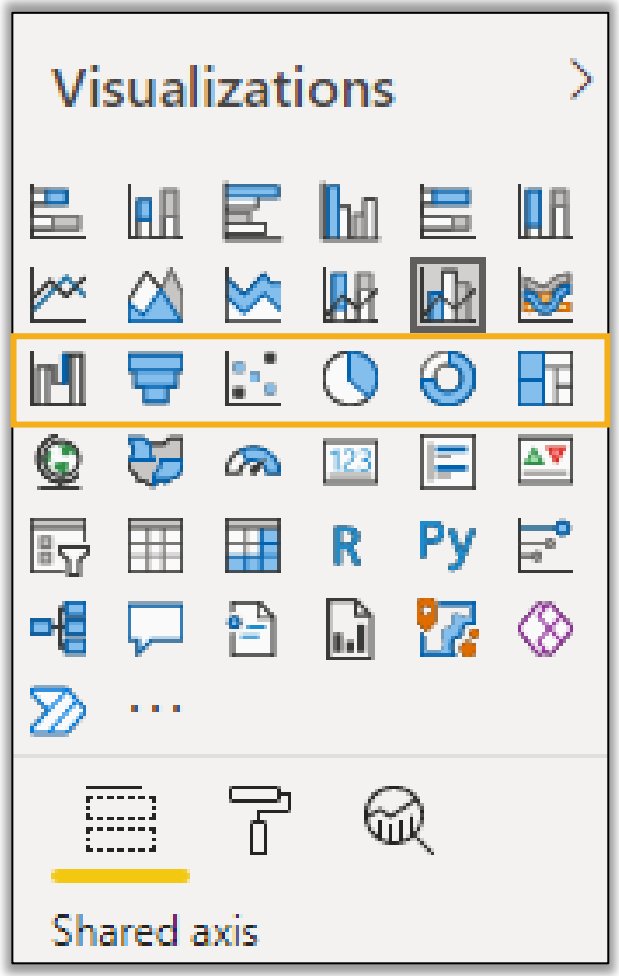
Visualization options



- **Line chart** – useful to look at how values change over time
- **Area chart and stacked area chart** – emphasizes the magnitude of change over time
- **Combined line and bar chart** – show multiple values over time
- **Ribbon chart** – shows rank change over time

https://docs.microsoft.com/en-us/power-bi/visuals/power-bi-visualization-types-for-reports-and-q-and-a

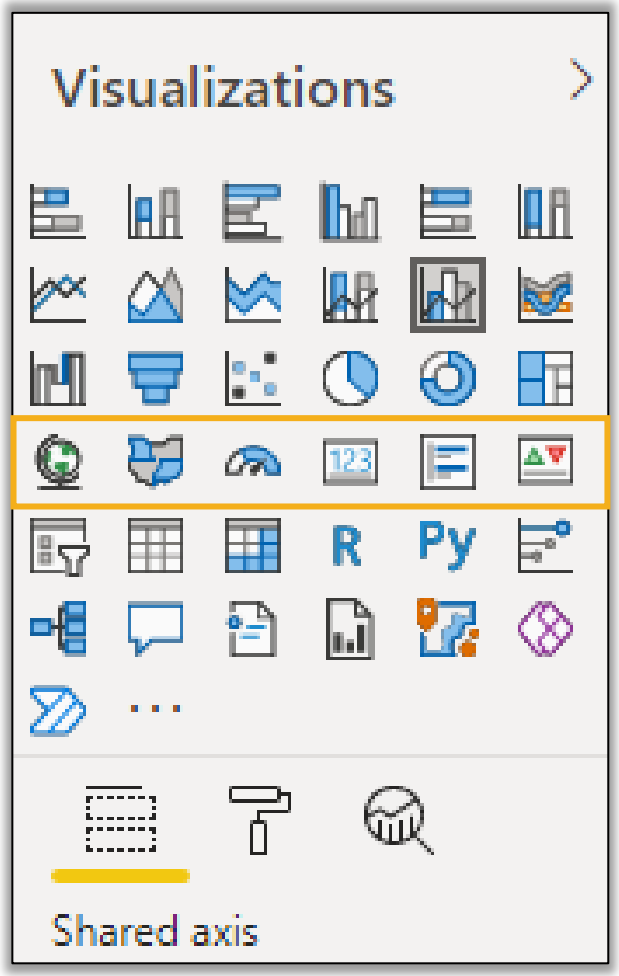
Visualization options



- **Waterfall** – shows running total – shows how a metric is composed of or changes through a series of positive and negative effects; great if you want to audit changes to a key metric
- **Funnel** – visualize a process that has stages (i.e., how many of our customers went from inspection to questioning to proposal to actual payting clients?)
- **Scatter plot** – shows two continuous variables, to show their relationship
- **Pie and donut** – shows the composition of a metric across different categories
- **Treemap** – colored rectangles, with size representing values; useful to display hierarchical data, or show proportions

https://docs.microsoft.com/en-us/power-bi/visuals/power-bi-visualization-types-for-reports-and-q-and-a

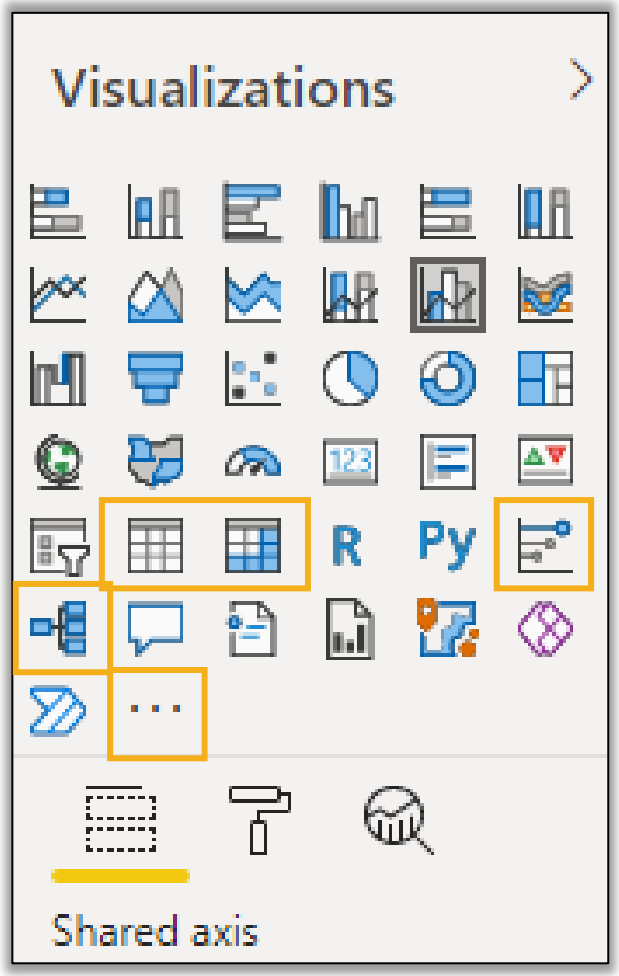
Visualization options



- **Map and Filled map** – shows values on a map
- **Gauge** – shows progress towards a metric or KPI, with a value for target
- **Card and multi-row cards** – shows single or multiple individual data points
- **KPI** – visual cue that communicates progress made towards measurable goal (measures progress, and distance to target)

https://docs.microsoft.com/en-us/power-bi/visuals/power-bi-visualization-types-for-reports-and-q-and-a

Visualization options



- **Table** – simple table (columns, rows)
- **Matrix** – table that supports a stepped layout
- **Key influencers** – shows major contributors to a selected result or value – helps you understand factors that influence a key metric (i.e., why was profit so high this year?) (AI visualization)
- **Decomposition tree** – visual data across multiple dimensions, to enable drill-down (AI visualization)
- **Custom / get more –** you can create custom visualizations, or download them from AppSource

https://docs.microsoft.com/en-us/power-bi/visuals/power-bi-visualization-types-for-reports-and-q-and-a

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Power BI Desktop Tabs

Reports	Data	Model
Create reports and visuals, most time spent here	***See and transform tables, measures, and other data***	***See and manage relationships in your data model***
• Create reports • Add and modify visualizations from underlying data • Add design elements like buttons) • Create new pages • Integrate with Power Platform	• See and analyze the underlying data in the "dataset" that you are using • Switch between different tables • Edit metadata about tables and columns, include data type • Create new columns	• Shows how the "dataset" works (i.e., how the different queries / tables are connected together in a visual format) • Enables you to set certain properties like relationship types and key columns • Combining data is called "modeling"

You can open up Power Query Editor (which allows you to import and transform data) from any of these tabs

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Power BI Desktop vs. Power BI Service

	Power BI Desktop (Free)	Power BI Service (Paid)
Connect to import data	Yes, includes the query editor which can connect to different source of data	Limited, you can only connect to established datasets, or manually paste your own data (through CSV / Excel)
Use Power Query to clean, transform, and combine data	Yes, includes the query editor, which can transform data and combine data	Very limited, you can do only a few operations
Create visualizations and reports	Yes	Yes (but moreso meant to edit), but cannot do things like themes, python, RLS creation, adding new measures, etc.
Dashboards	No	Yes
Manage apps and workspaces, with access to different reports and dashboards	Does not exist	Yes
Sharing and collaboration	Yes, but limited to saving a .pbix file and sharing the file to users	Yes, in many different ways (shared links, Teams), through workspaces, and with sophisticated permission roles
Dataflow creation and paginated reports	No	Yes
Type	Application you download and install for free	Cloud-based service (SaaS model)
Users	Data analysts or engineers, report creators	Data analysts or engineers, report creators, everyone who wants to consume Power BI reports and dashboards
Security, Filters, Bookmarks, Q&A, R visuals	Yes	Yes

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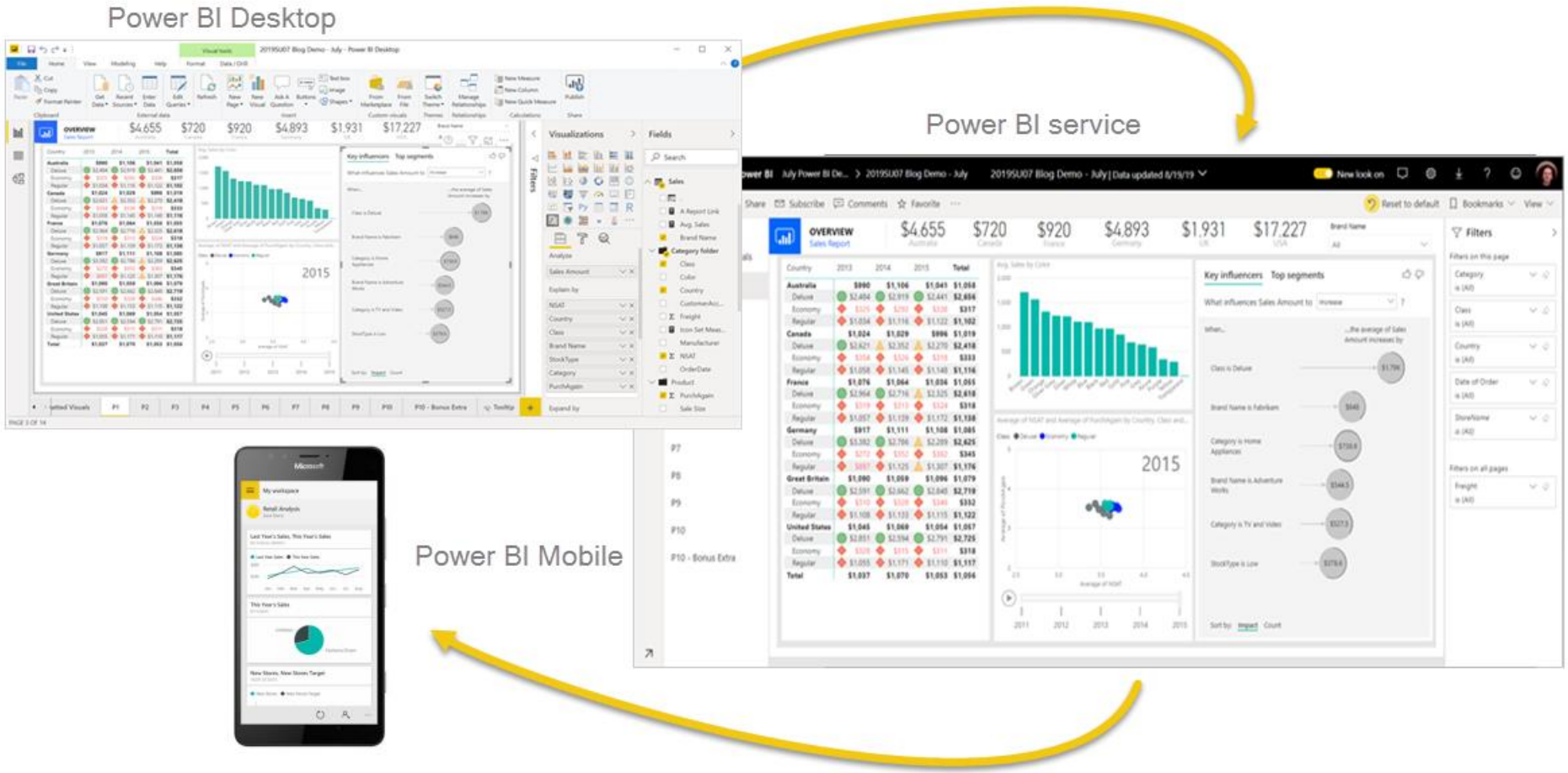
Power BI Desktop vs. Power BI Service



https://docs.microsoft.com/en-us/power-bi/fundamentals/power-bi-overview

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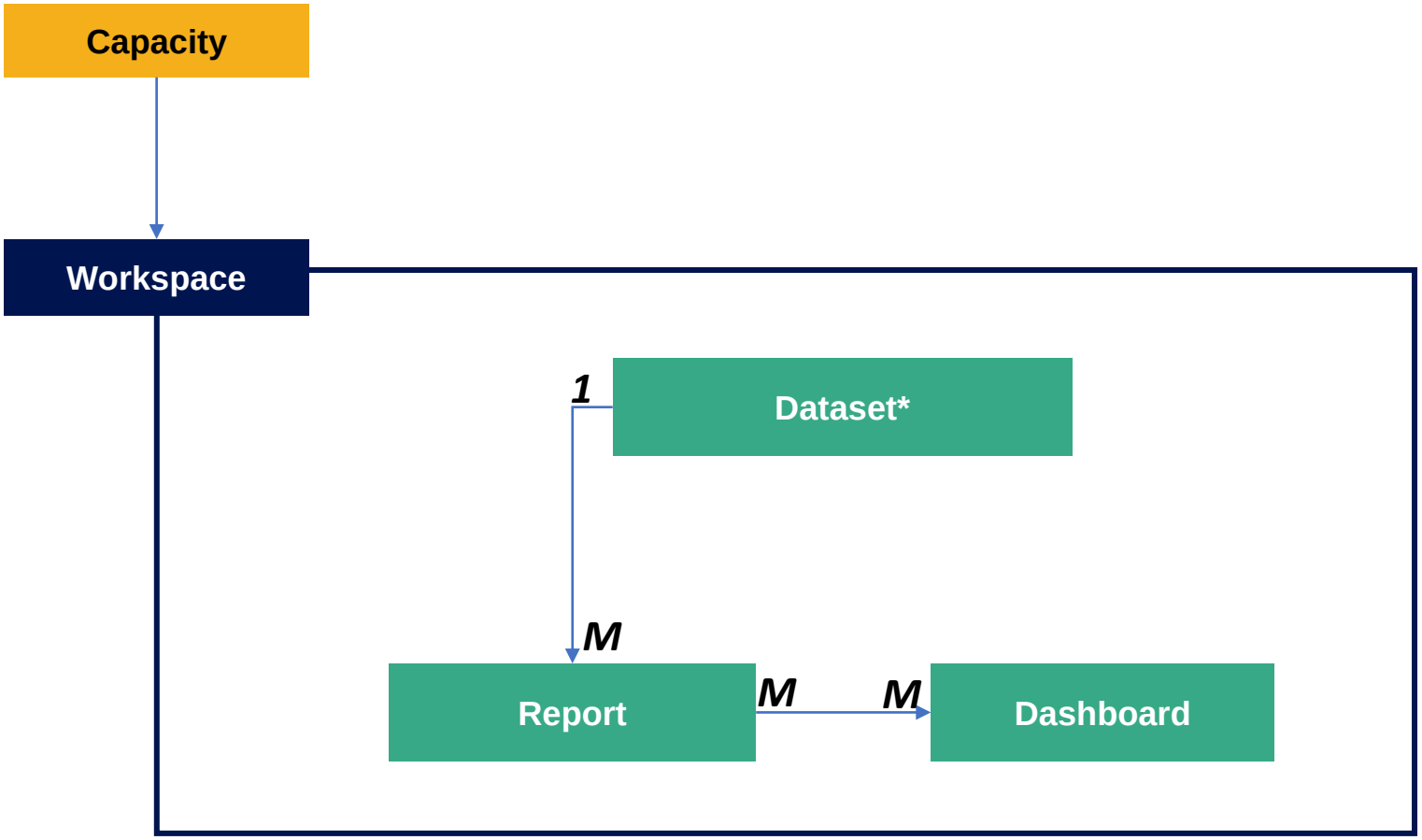
Power BI Service Concepts



*ONE dataset can be used over and over in many different workspaces

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Power BI Service Concepts

Workspaces

- Containers for dashboards, reports, workbooks, datasets, and dataflows
- There are two types of workspaces
- *My Workspace* is your personal space, where only you have access
- Workspaces are containers that can be shared with other users, for collaboration (each member needs a license)

Capacity

- Core unit of resources (storage processor, and memory) that actually powers Power BI Service
- They can be shared or reserved – reserved requires a dedicated subscription
- Workspaces are associated with capacities
- With workspaces with shared capacities, there are limitations for fair play

Datasets

- Collection of data that you import or connect to, then transform, and then combine (called 'modeling')
- One datasets can be used again and again in many workspaces, dashboards, and reports

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Power BI Service Concepts

Reports

- One or more pages of visualization or “visuals” (charts, maps, etc.)
- All visuals come from one dataset
- Reports can be in reading mode or editing mode, and is contained in a single workspace
- Reports can be created from scratch, or from an existing tile in a dashboard
- One report can be associated with multiple dashboards

Dashboards

- Single canvas containing tiles and widgets, coming from reports
- Used for monitoring, to see all required info. At one glance, etc.
- Each dashboard is associated with one workspace, can display visualizations from different datasets and reports, and can display visualizations from other tools

Dataflows

- Optional, helps to unify data from disparate sources, used in complex projects
- You can use extensive collection of Microsoft data connectors
- Stored as entities in the Common Data Model in Azure Data Lake (Gen2)

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Power BI Security Model

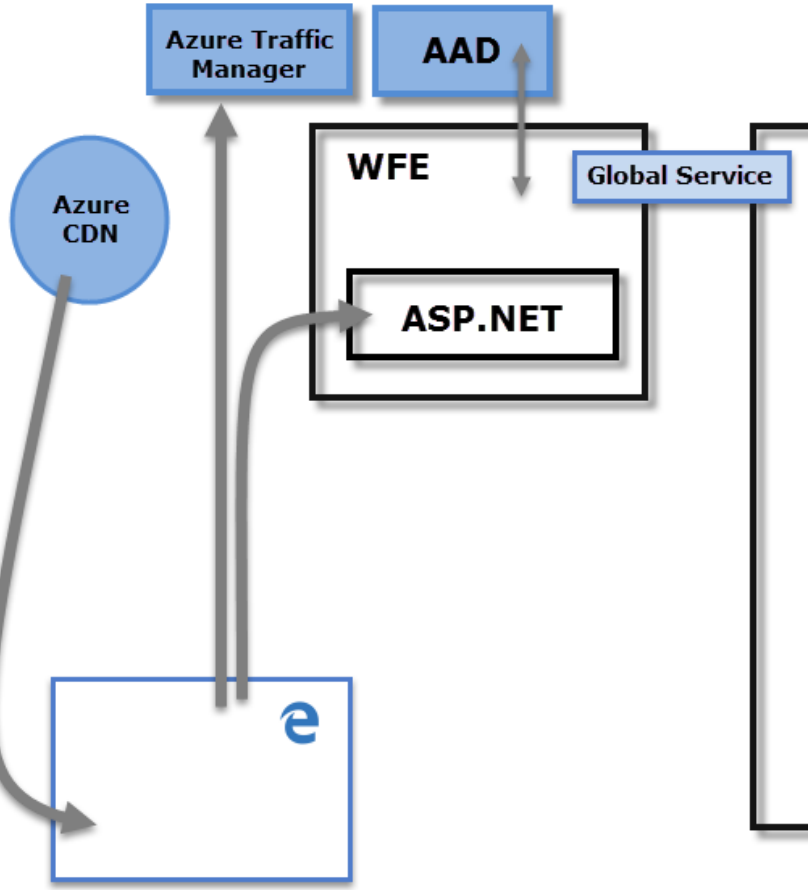
- Similar to other Microsoft products, Power BI is built on Azure (very secure); users signs in with Azure AD
- Datasets, reports, and dashboards are put into workspaces; only users who have access to the workspace (they must be invited) can actually access any element in the workspace
- Users, however, are responsible for their own data

	Admin	Member	Contributor	Viewer
Read	✓	✓	✓	✓
Build	✓	✓	✓	✗
Reshare	✓	✓	✗	✗
Write	✓	✓	✓	✗

https://docs.microsoft.com/en-us/power-bi/connect-data/service-datasets-permissions

Power BI Security Model

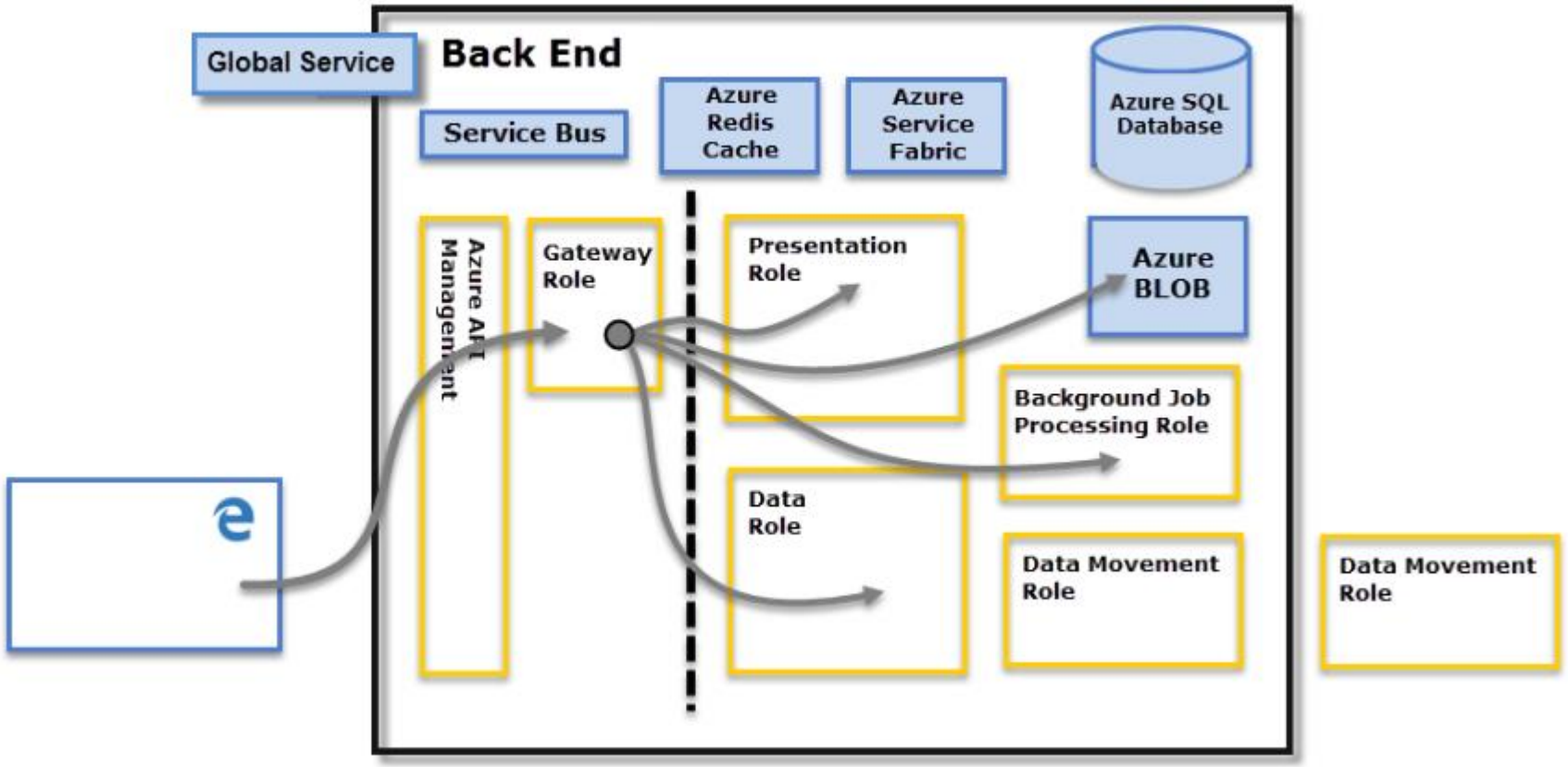
Front-end



https://docs.microsoft.com/en-us/power-bi/enterprise/service-admin-power-bi-security

Power BI Security Model

Back-end



https://docs.microsoft.com/en-us/power-bi/enterprise/service-admin-power-bi-security

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Aggregate Functions

What is it?

Mathematical way to “combine” a set of numbers into 1 number. When creating visualizations, Power BI aggregates your data. The types of aggregations depend on the type of data that you have.

Numeric

- Sum
- Average
- Minimum
- Maximum
- Count
- Count (Distinct)
- Standard Deviation
- Variance
- Median

Categorical

- Count
- Count (Distinct)
- First
- Last
- Earliest
- Latest

Datasets

Dataset

- Collection of data that you import or connect, and their associated transformations and relationships
- Datasets can also source data from data flows
- Datasets are associated with a workspace

Shared dataset

- Simply a dataset that is shared across the organization
- Useful for standardization, consistency, and collaboration across the organization (i.e., everyone builds visualizations from one source of truth data set)
- Usually optimized as well for speed
- Usually is updated frequently
- Choose “Power BI datasets” as a source to select this type of dataset

Template Apps

What are Apps?

- Collection of interactive dashboards and reports built to deliver key metrics to the Power BI consumers in your organization
- These are associated with a workspace in the Power BI service

What are Template Apps?

- Power BI partners can built apps and then deploy them to any Power BI user, with little to no coding
- For example, you can create template apps for your customers that enable them to look at their account data, and then deploy them to their Power BI service
- Standardized templates can also be submitted to the Partner center, at which point it is available publicly in the Power BI Apps Marketplace or Microsoft Appsource

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Options for viewing reports and dashboards

Power BI Desktop	Power BI Service	Embedded	Printed
Mainly used to create reports, but can be used to view from .pbix file (reports only) Edit a visualization by clicking on a dashboard from Service Cannot view dashboards here	Can view both reports and dashboards that you have created, ones that have been shared with you, ones that are in a workspace you are in, or directly Tools to edit and share	Reports and dashboards can be embedded into websites, Power Apps, SharePoint, through email links, and more Live update, interactivity, and filtering options are available Permissions settings to datasets need to remain 'open'	Reports and dashboards can be exported / printed to PDF and then shared Lowest form of viewings, as data does not update, and is not interactive

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Model-Driven Apps

Steps

- Model business data
- Define business processes
- Compose the app
- Configure security roles
- Share app

DATAVERSE

- Create Dataverse environment
- Create tables
- Define schema of tables
  - Column
  - Relationships
  - Keys
- Define data experiences
  - Forms
  - Views
  - Charts
  - Dashboards
- Define customizations
  - Business rules
  - Commands

Model-Driven Apps

Steps
Model business data
Define business processes
Compose the app
Configure security roles
Share app

APP INTERFACE

- Create the Site Map
- Define what tables, views, forms, charts, dashboards, and business processes are visible to the user
- Inherit security roles from Dataverse
- Publish and share the app

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Model-Driven Building Blocks

Data	UI	Logic	Visualization
Table	App	Business process	Chart
Column	Site map	Workflow	Dashboards
Relationship	**Forms**	Actions	**Power BI**
Choice	**Views**	Business rule	
		PA Flows	

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Model-Driven App Element – Forms

Form definition	Types of forms
Forms define how users see and interact with data, usually one record from a table Forms are used to add data to a table, edit data, delete data, and of course view data Every table requires at least one “Main” form	**Main:** Main interface for data view / edit **Quick Create**: Basic form optimized for quickly creating new records **Quick View**: these forms appear within main forms to display additional data for a row that in referenced by lookup columns **Card**: designed to present information on compact format suitable for mobile devices

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Model-Driven App Element – Views

View definition	Types of views
Views show multiple rows from the same table Views control the following 1. What columns to display, its width, and the order of columns 2. Any filters applied to the rows 3. The sort order applied to the rows	**Personal views:** views owned by an individual, and only accessible to them **Public views:** General purpose views that all users of an app can access (unless restricted) by using view selector – these can also be used as sub-grids within forms **System views:** Only a system admin can customize system views; these are special-purpose views created by default for all tables for particular circumstances in app usage: • **Quick find:** what view appears when the “Quick Find” app feature is used, and what to search on • **Advanced find:** what view appears when the “Advanced Find” app feature is used, and what to search on • **Associated:** Default view when clicking “Related” tables • **Lookup:** View when column uses the Lookup feature

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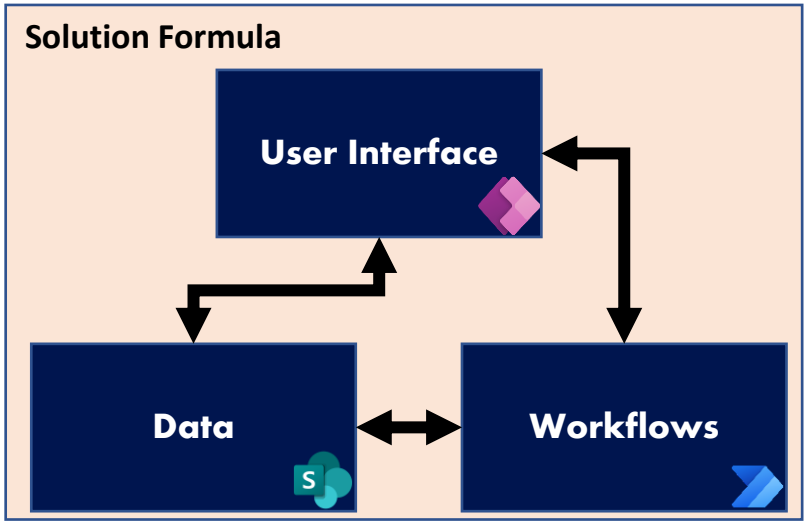
Model-Driven Security Roles

ABOUT PREDEFINED SECURITY ROLES

Security role	Privileges	Description
Environment Maker	None	Users who have this role can create new resources that are associated with an environment, including apps, connections, custom application programming interfaces (APIs), gateways, and flows that use Power Automate. But these users can't access the data in an environment. To learn more about environments, see Announcing Power Apps environments.
System Administrator	Create, Read, Write, Delete, Customize	This role has full permission to customize or administer the environment, including creating, changing, and assigning security roles. Users who have this role can view all data in the environment. To learn more, see Privileges required for customization.
System Customizer	Create (self), Read (self), Write (self), Delete (self), Customizations	This role has full permission to customize the environment. But users who have this role can view rows only for environment tables that they create. To learn more, see Privileges required for customization.
Microsoft Dataverse User	Read, Create (self), write (self), delete (self)	Users who have this role can run an app in the environment and perform common tasks for the rows they own.
Delegate	Act on behalf of another user	This role lets code run as or impersonate another user. This role is typically used with another security role to provide access to rows. To learn more, see Impersonate another user.

https://docs.microsoft.com/en-us/learn/modules/how-build-model-driven-app/06-control-security-share-model-driven-apps

Solutions



Power Platform

What is it?

https://docs.microsoft.com/en-us/learn/modules/introduction-power-platform/2b-business-value

Types of apps

Canvas Apps	• Build an app from scratch • Drag and drop visual elements like buttons, labels, textboxes, galleries, and more, with Excel-type formulas • Complete flexibility • You need to choose screen size
Model-Driven Apps	• Fully-functional application built from data with themes for things like forms, views, business rules, etc. • You cannot build custom experiences • You can only build if underlying data is in Dataverse • Fully responsive (you don't choose screen size)
Portals (now called Power Pages)	• Create external facing websites • Allows users to interact anonymously or through authenticated means – they can add data, edit data, view data • Data must be held in Dataverse

Formulas

- Formulas enable you to create custom logic within your applications; you can use formulas to:
  - Define what a property of an control is dynamically (**property assignment**)
  - Define what happens when an “event” occurs, like pressing a button (**action assignment**)
- Formulas have very similar use-cases to Excel
- Formulas use the following elements:
  - **Functions** take in input, perform an operations, and produce an output (e.g., Concat(), SubmitForm, Refresh, Set)
  - **Signals** return information about the user, or the environment (e.g., Now(), Location, User().email)
  - **Enumerations** return pre-defined values, enabling you to access specific data elements easier (e.g., Color.Red)
  - **Named operators** provide data about a variable (ThisItem)
  - **Operators** bridge variables together and provide custom logic (&, |, etc.)
  - **Control properties** – properties about controls on the page (TextInput1.Text)
- See all functions: https://docs.microsoft.com/en-us/power-apps/maker/canvas-apps/formula-reference

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Property Assignment

Back | File | Home | **Insert** | View | Action | Settings

Test

New screen | Label | Button | Text | Input | Gallery | Data table | Forms | Media | Charts | Icons | Custom | AI Builder | Mixed Reality

Text = fx "This is static text"

Tree view

Screens | Components

Search

App

Screen1

Label1

TextInput1

Hello World

This is static text

LABEL

Label1

Properties | Advanced | Ideas

Text	This is static text
Font	Open Sans
Font size	13
Font weight	Normal
Font style	/ U
Text alignment	
Auto height	Off
Line height	1.2
Overflow	Hidden
Display mode	Edit
Visible	On
Position	467 (X), 52 (Y)
Size	150 (Width), 40 (Height)
Padding	5 (Top), 5 (Bottom), 5 (Left), 5 (Right)
Color	
Border	0
Focused border	0
Wrap	On

80 %

Waiting for org033c43ce.crm3.dynamics.com...

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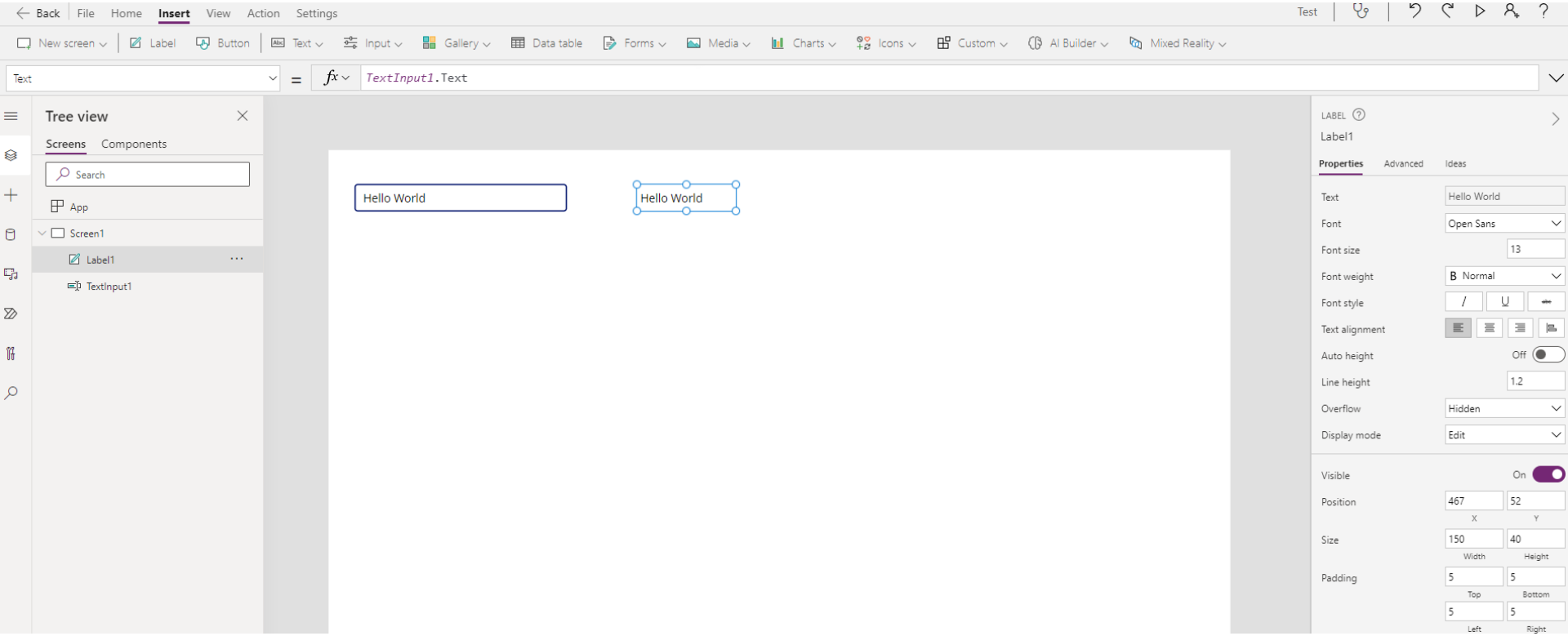
Property Assignment



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Data sources

Connected data sources

- Data sources that are external to Power Apps, that you connect to using a connector
- Most common type are tables, but you can also have data sources from email, calendar, Twitter, etc.

Local data sources

- Data that is stored locally to the application
- Local data can be “taken” from a connected data source and then stored internally
- Includes **collection** variables
- They are not stored anywhere; they just exist in your app’s memory
- Downsides: Not backed by a connection to a service, and so information cannot be shared across devices; they just stay in memory and are deleted after an app is closed

Note: you do not create data sources in Power Apps; the data source must already be created, and you simply connect to it using a connector

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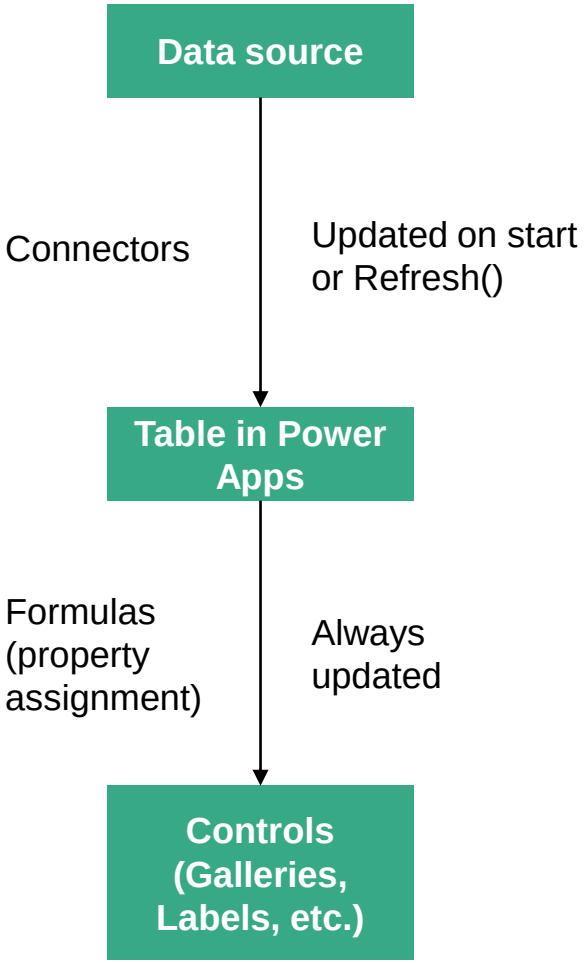
How to work with data sources (data load)



- Information travels from the data source to a "Table" variable in Power Apps, through a "connector"
  - This information is refreshed during App Start or when the refresh function is called
- Information is exposed to the user from the "Table" to Power App controls (labels, galleries, data tables, images, etc.) using "formulas"
- The table variable itself can also be filtered, sorted, lookup'ed, and a variety of other functions can be used

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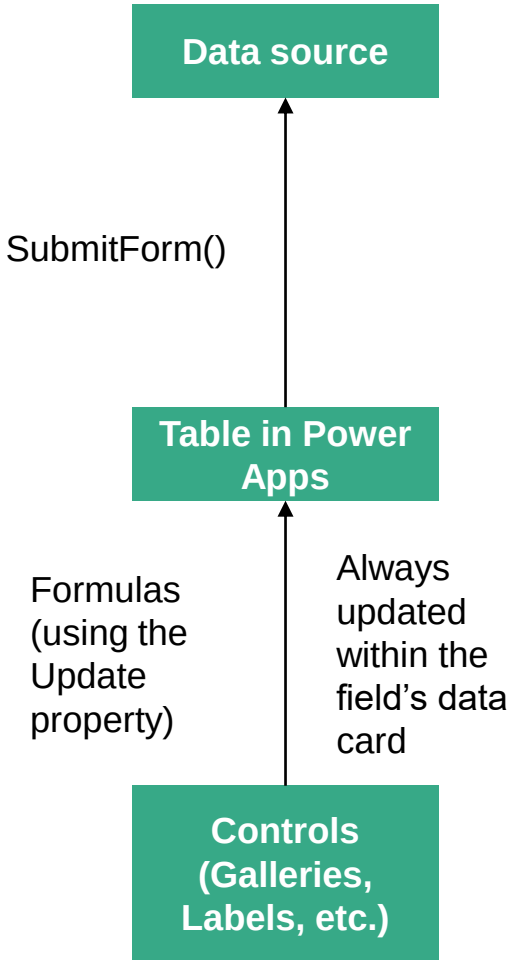
How to work with data sources (data update)



- Edit Forms map each field to a "data card"
- The Update property in a "data card" tells Power Apps what value in the controls map to each data field
- When the SubmitForm() function is called, the value in the "Update" property of the data card is written into the field value in the Data Source
- Please see the demo to understand the whole concept

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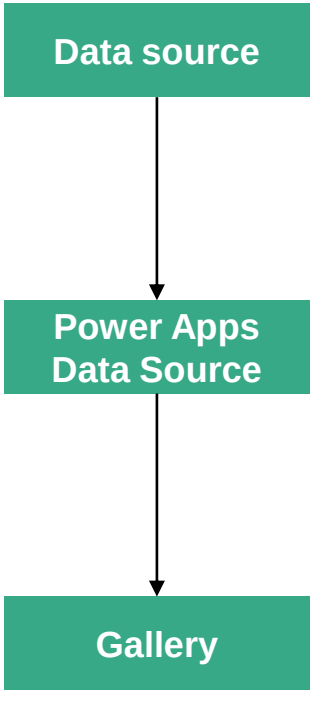
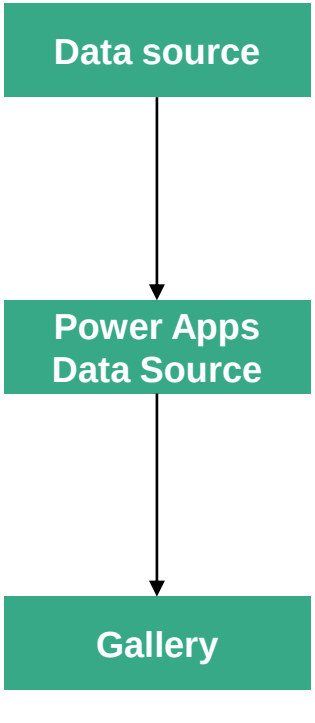
Delegation



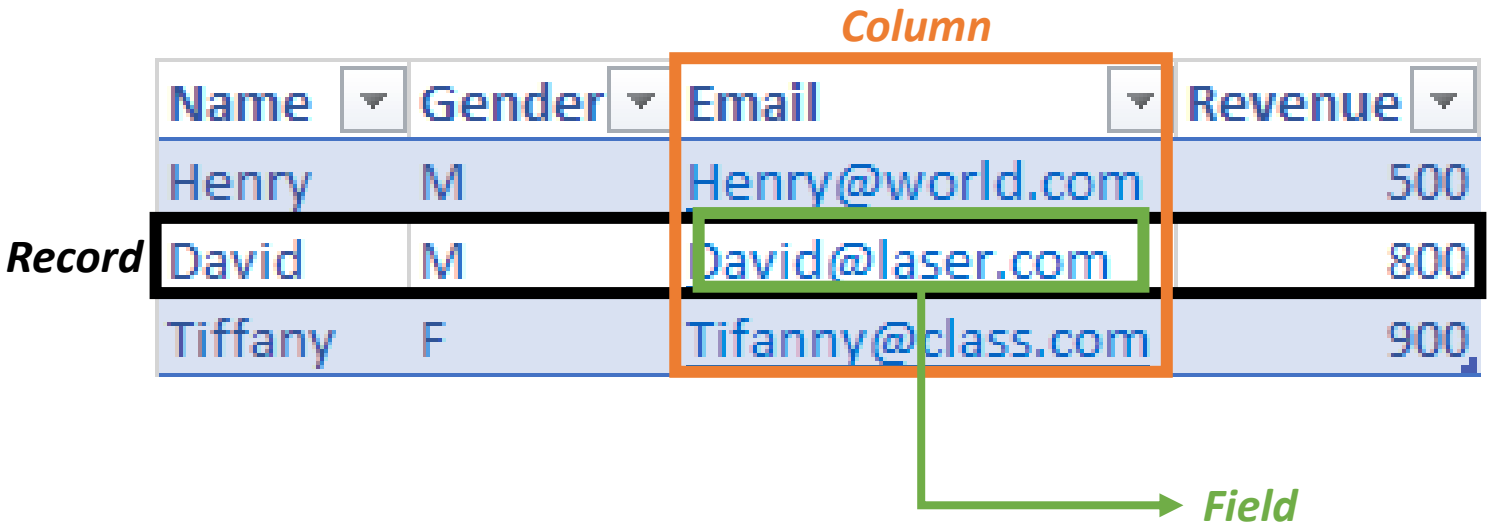
500 (default, max is 2,000) row limit

Delegation – filter records BEFORE they come into Power Apps

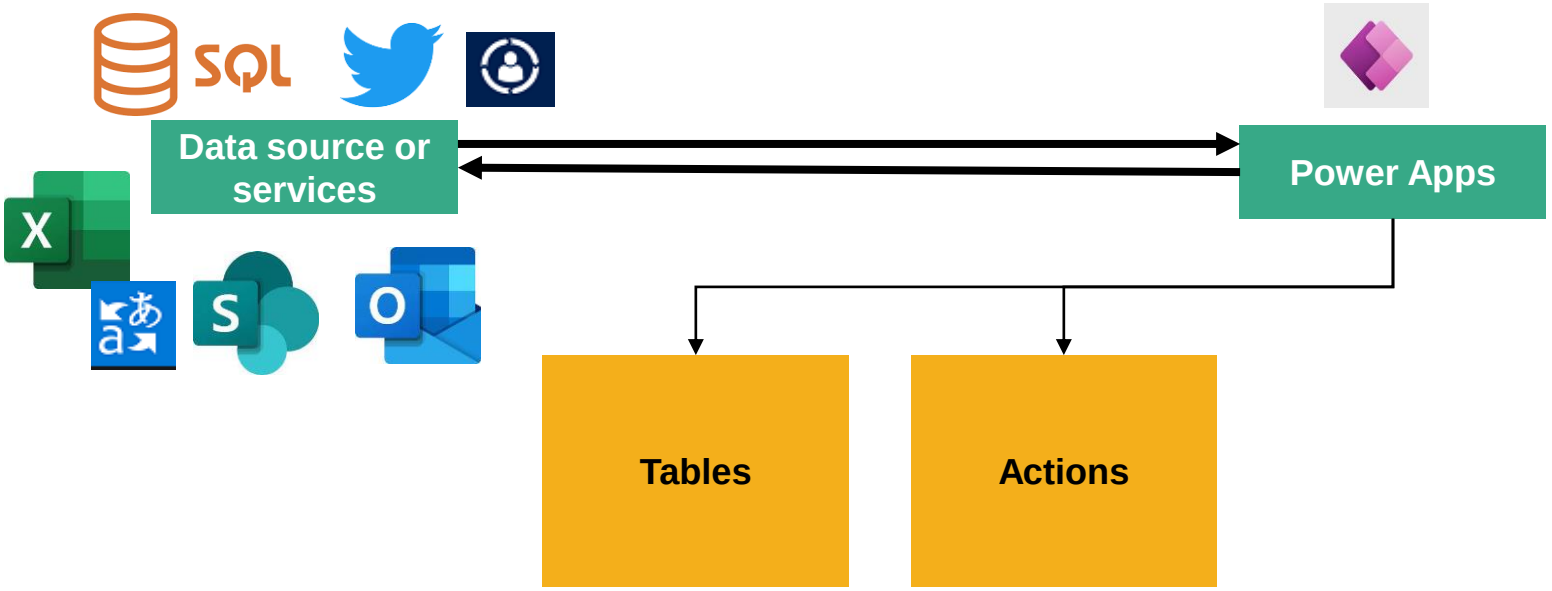


Restriction: Dataverse, SharePoint, SQL server, Salesforce

Tables



Connectors



- In order to use a connector, there must be **authentication** and **consent** – which may need to be shared to all users of the application. Authentication can be Azure AD Integrated, OAuth, standard username and password, and Windows authentication
- Connectors can be standard, premium (requires special licensing), or custom (build your own connector)

Popular connectors

Microsoft Dataverse		Cloud storage **	
Dynamics AX		Excel	
Microsoft Translator		Office 365 Outlook	
Office 365 Users		Oracle	
Power BI		SharePoint	
SQL Server		Twitter	

https://docs.microsoft.com/en-us/power-apps/maker/canvas-apps/connections-list

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Common controls

Galleries	Displays several records from a table – each row is defined by a “template of controls”, that is repeated on every record / row
Forms	Displays one record from a table, enabling user to view detailed information about record, create new records, and / or edit existing ones
Input controls	Controls that take in input from your users (textboxes, dropdowns, date pickers, etc.), each with multiple customizable properties
Intelligent controls	Rich controls that take advantage of your device’s hardware, like camera, barcode scanner, etc.
Media	Enables you to add media elements to your apps, like photos and videos
Functions and formulas	Custom logic that combines controls, inputs, tables, and data sources together – we use functions to create formulas in apps, for dynamic assignments or dynamic actions

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Publish and share

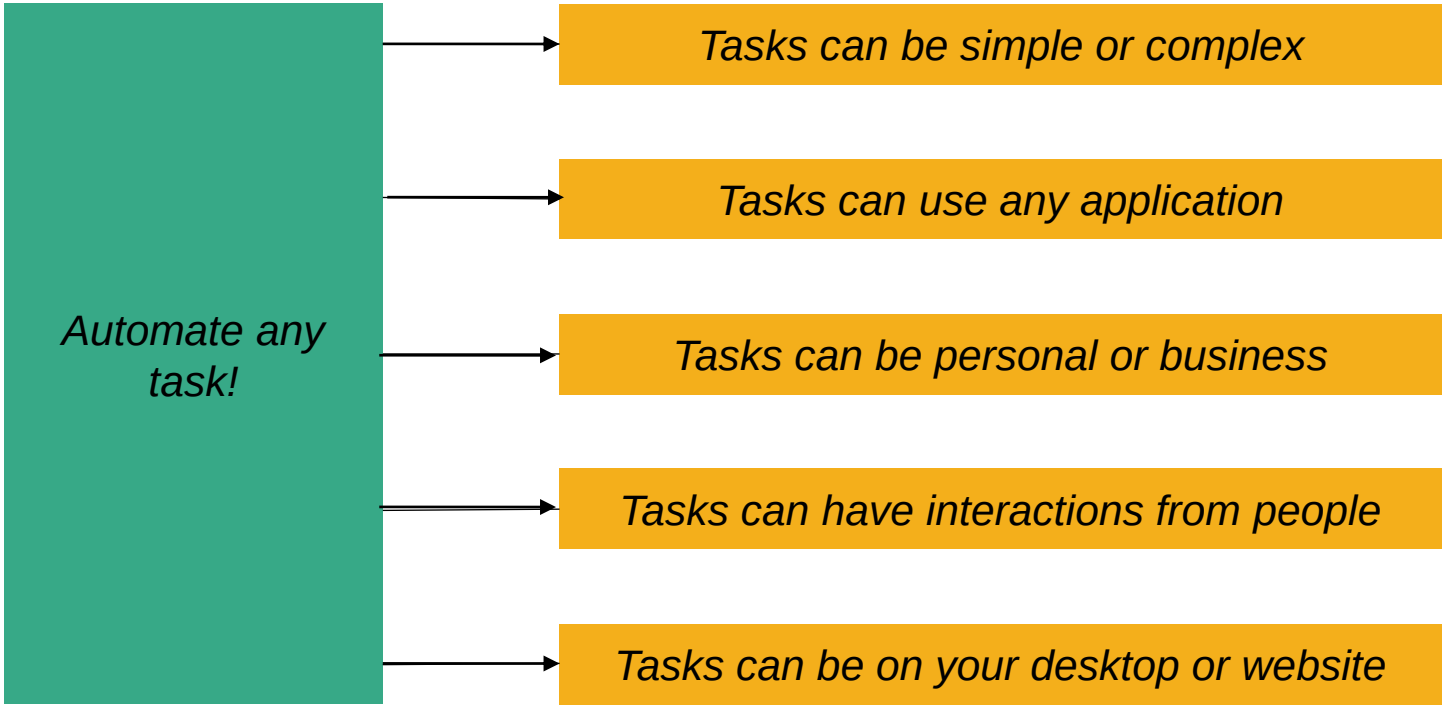
Save	Save the App under the “File” menu – similar to word documents, you can “Save” and “Save As” – you can either save it to cloud or on your computer
Versioning	Every time you save, a new version is submitted. You can see all versions and can restore a previous version if you wish.
Publish	Publishing makes your changes Live to everyone. Only one “version” of the application is “Live” at one time – saving an app does not automatically publish it. You need to publish the new version yourself after making changes.

Share	• You can share the app to everyone, to specific people, or to security groups
	• There are two permission settings:
	  • User: View and use the app
	  • Co-owner: Use, edit, and share the app (cannot delete)
	• Security groups should be used instead of sharing to individual people
	  • If a security group has app permissions, all members of security groups (now and in the future) will have acess

Types of flows

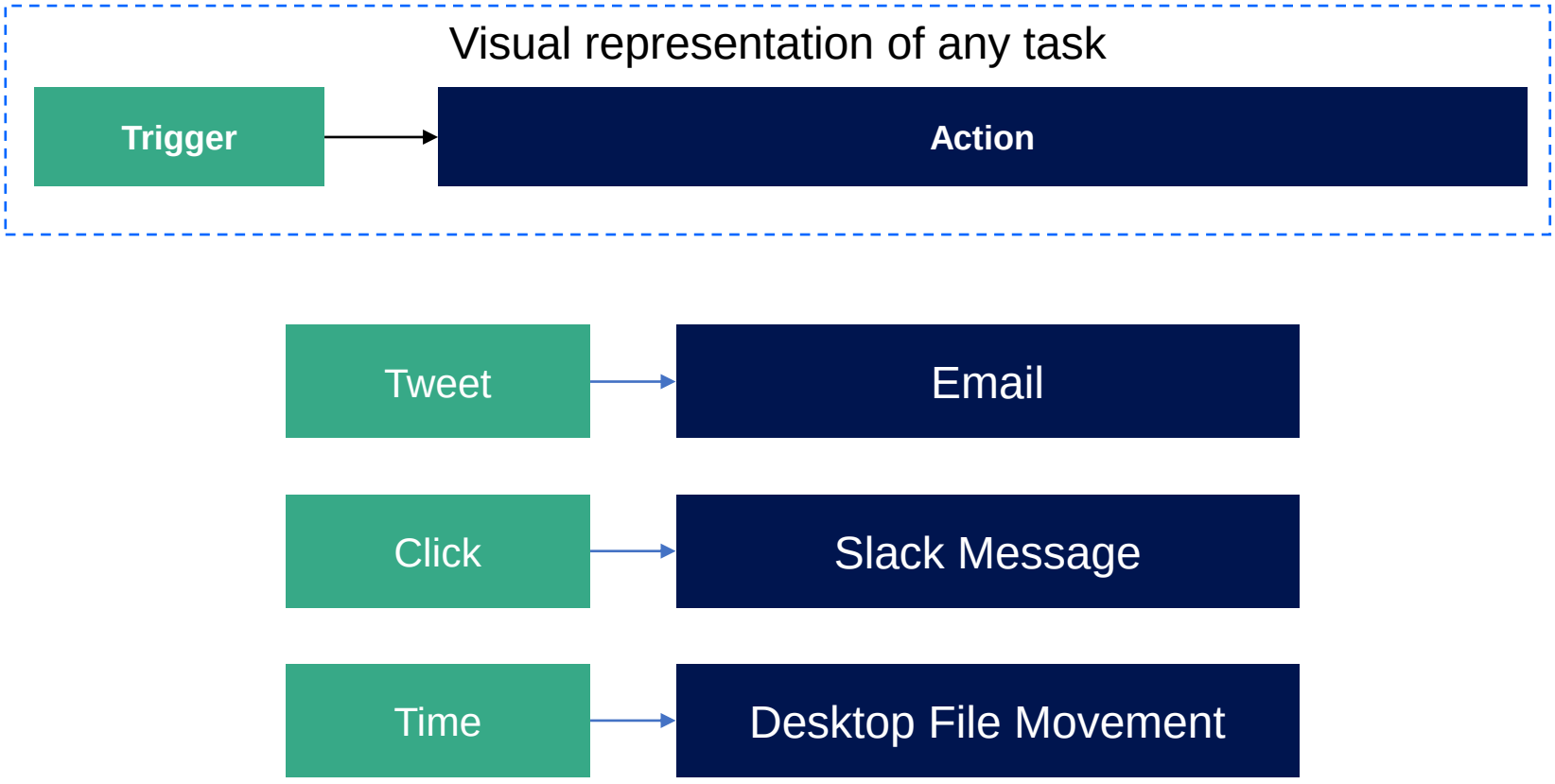
Cloud flows	• Flows that use online connectors to achieve their tasks, and consist of one trigger with one or more actions • These flows can be found online (My flow or Team flow, based on ownership) • Three types (automated, instant, scheduled)
Business process flows	• Enhance experience of Model-driven apps and Dataverse • Guides user through complex touch points to fill out forms
Desktop flows	• Enables you to automate actions and movements on your desktop or in the web browser, inputting and extracting data • Great to automate software that does not have a connector or APIs – can also be combined with cloud flows • Also called Robotic Process Automation (you can record actions)

Use case of flows



*Streamline and automate **any** workflow… with no code*

What is a flow?



What is a flow?

Flows can have multiple actions

Flows can also have conditions, loops, approvals, and more (discussed later)

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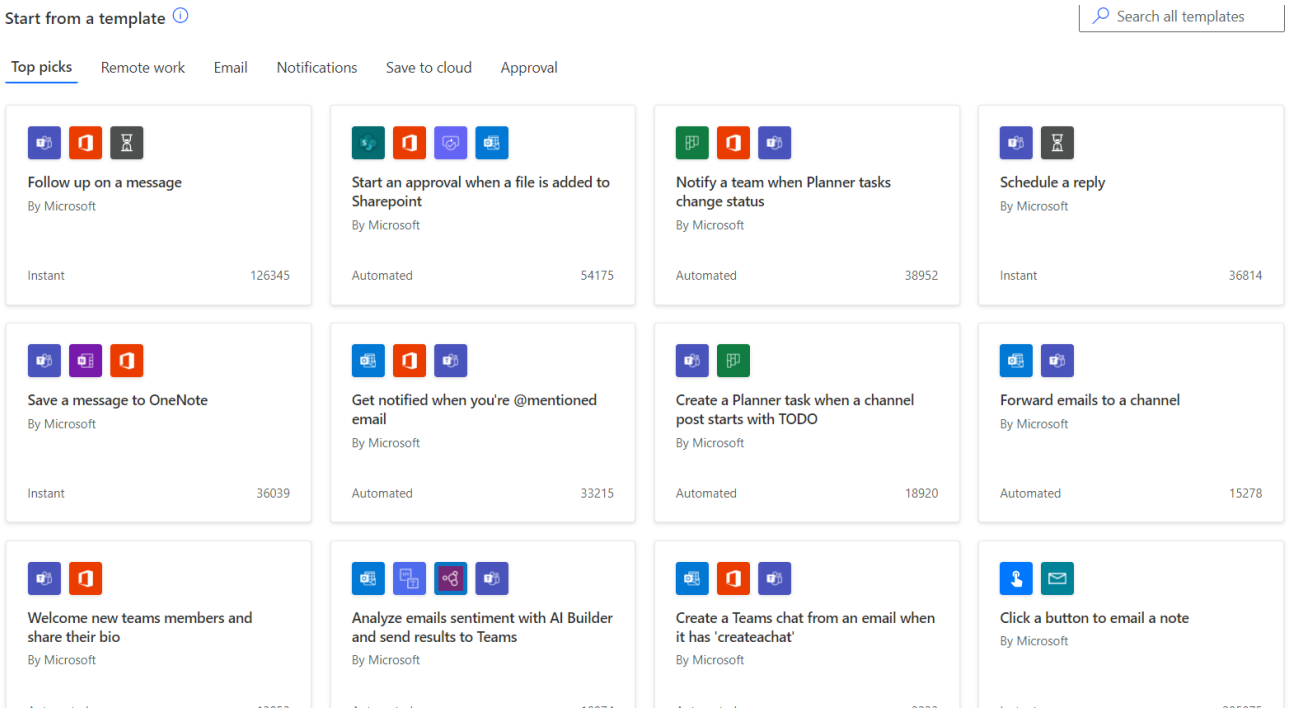
Flow Templates

- Flow templates enables you to quickly create a flow to automate a common task
- Microsoft Power Automate has hundreds of different templates, which you can sort by type and connector used
- After you select a template, you need to connect to the connectors that are used in this template
- After that, the flow should just work – it's plug and play at that point



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Connectors, Triggers, Actions

Connectors

- Bridge from your workflow to an application, which allows Power Automate to receive and send information and actions
- This allows you to access data, send actions, and receive triggers across different platforms
- 600 connectors

Triggers

- Starts a flow
- Could be a event-based, instant, or time-based

Actions

- Functionality that is executed on the connector
- Email → send an email
- Twitter → Send a tweet
- SharePoint List → access records and add new row

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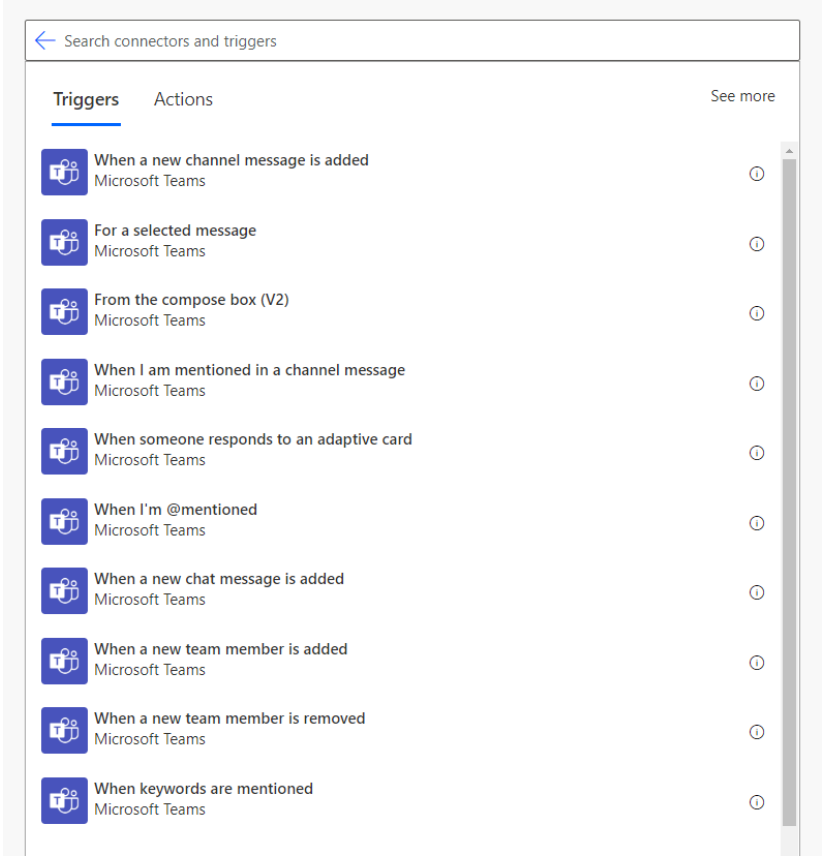
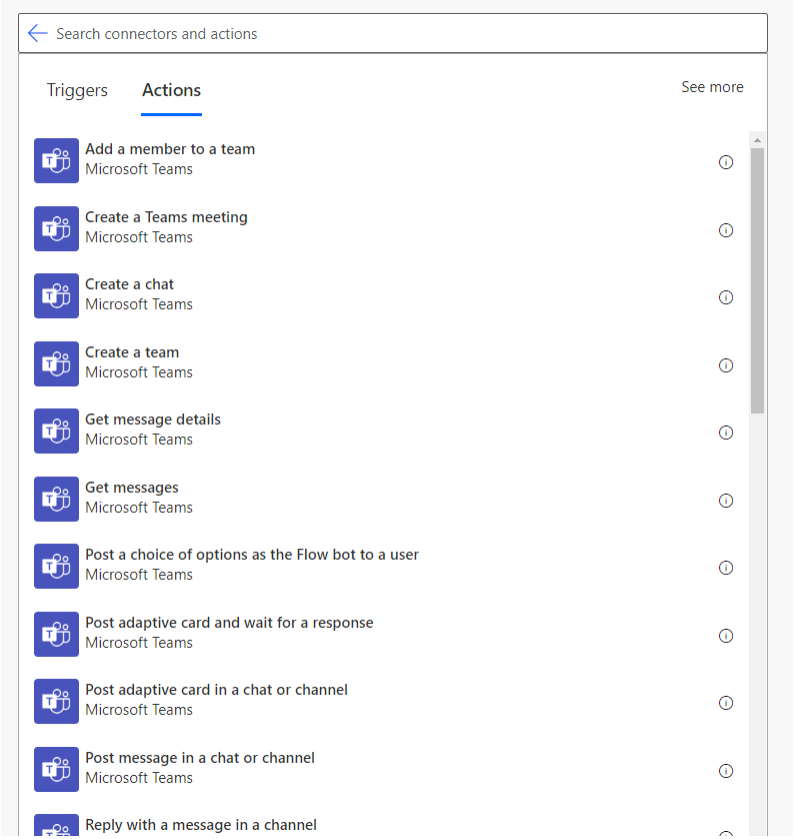
Example Connector





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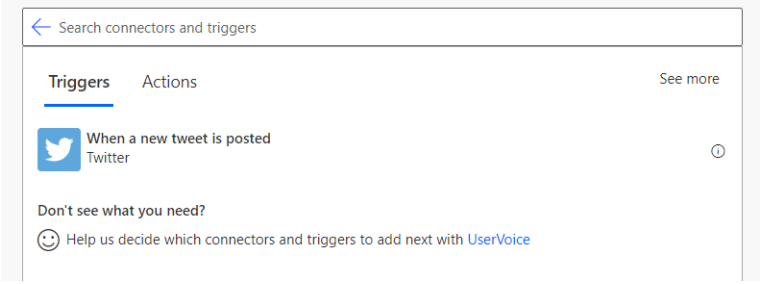
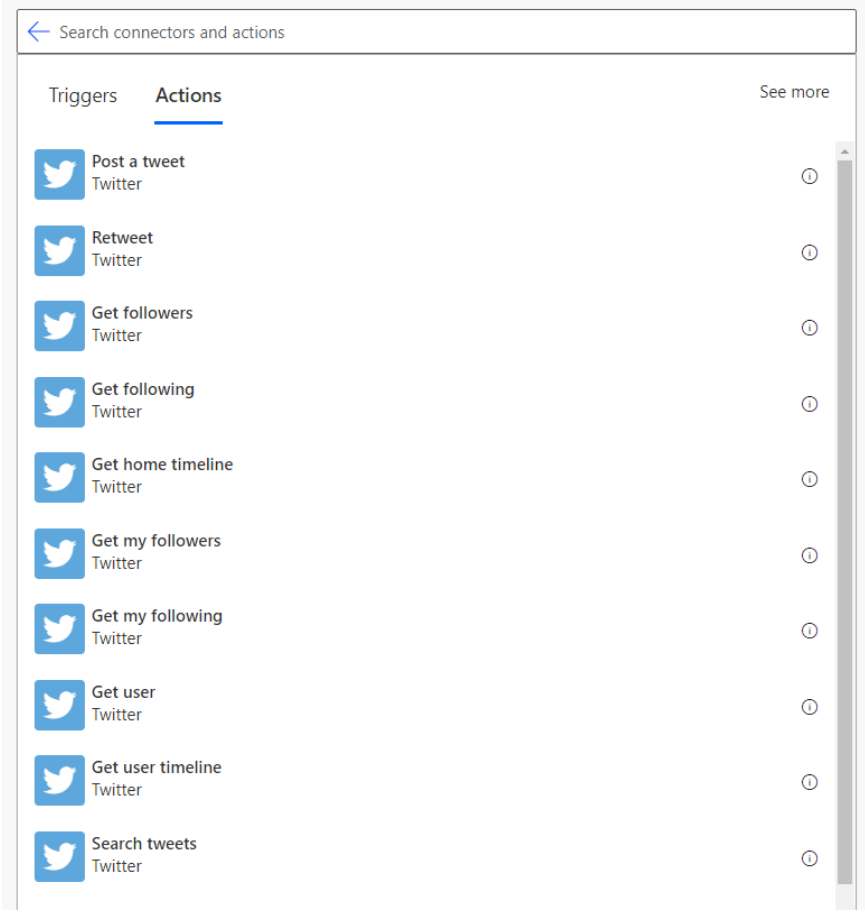
Example Connector





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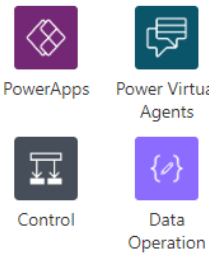
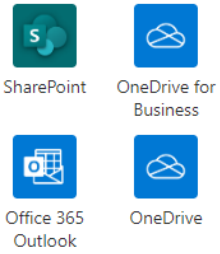
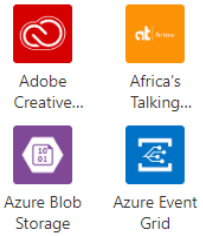
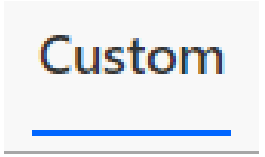
Types of Connectors

Built-in	Standard	Premium	Custom
Provides Power Automate specific actions, used to control flows, create expressions, and user-based triggers	Popular connectors that you do not need additional licensing for	App-based connectors where additional licensing or payment is required	Connectors you build yourself that works with another app's API

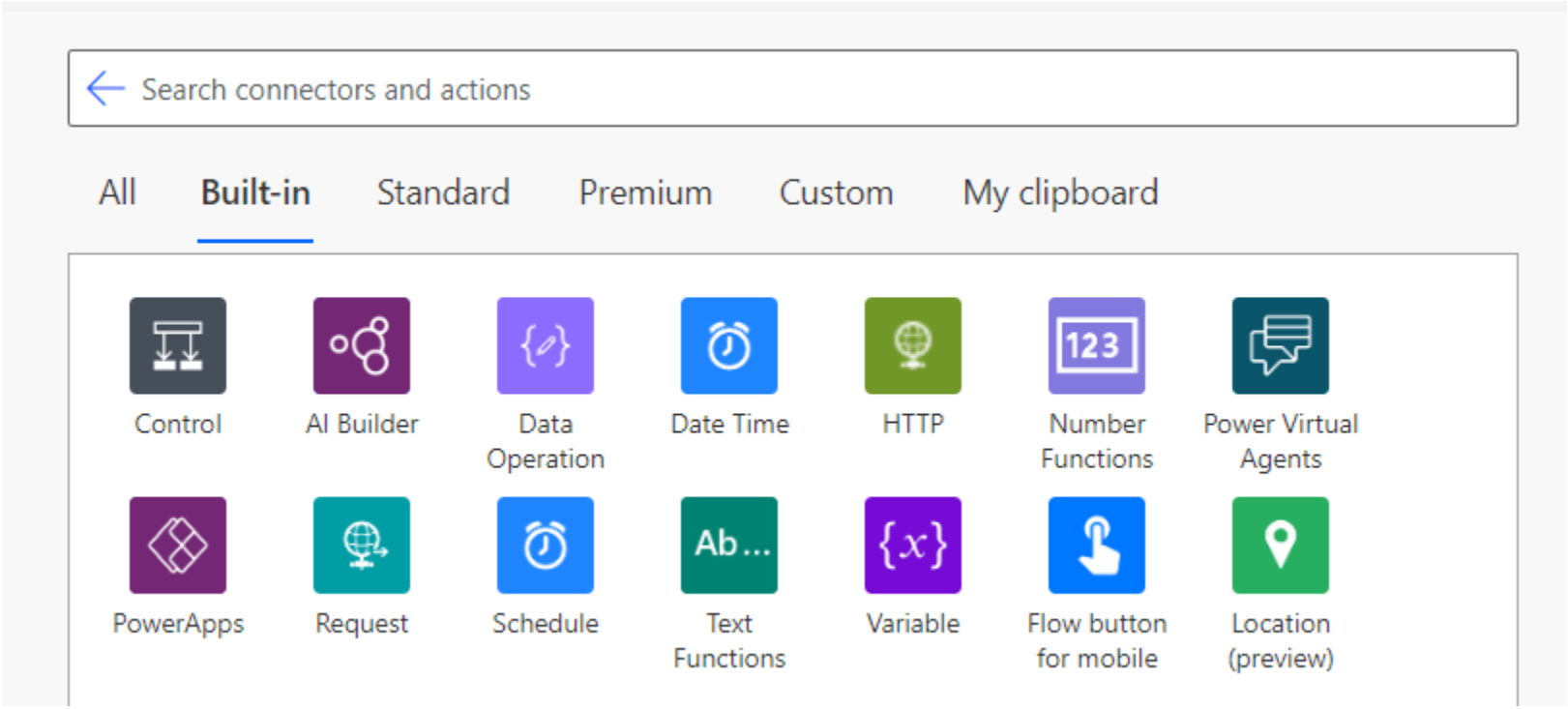




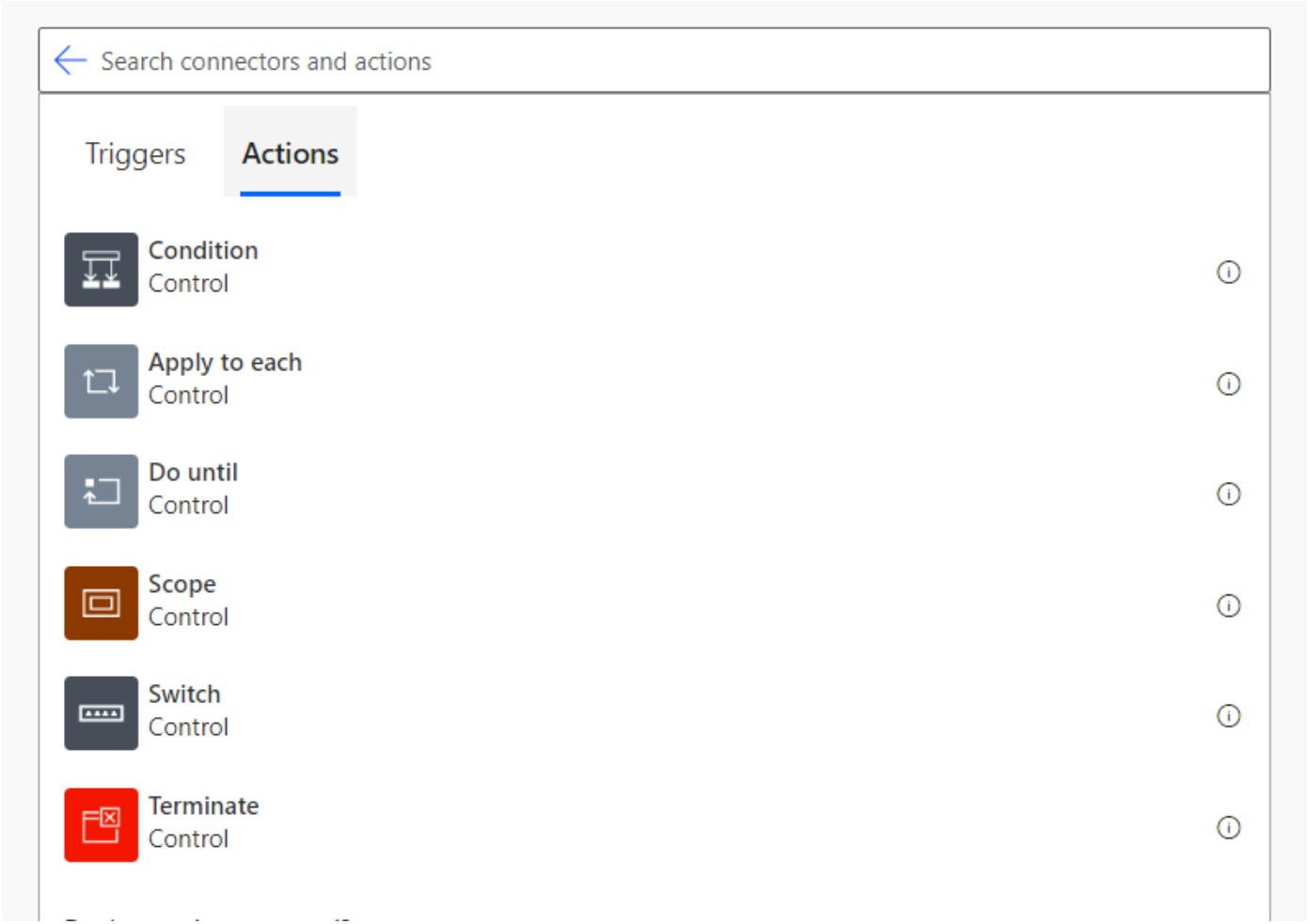




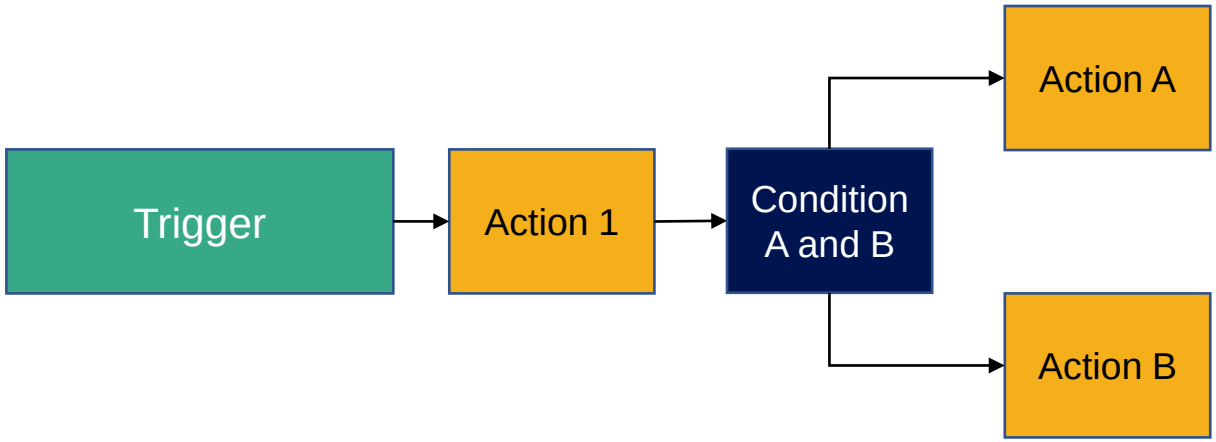
Built-in connectors



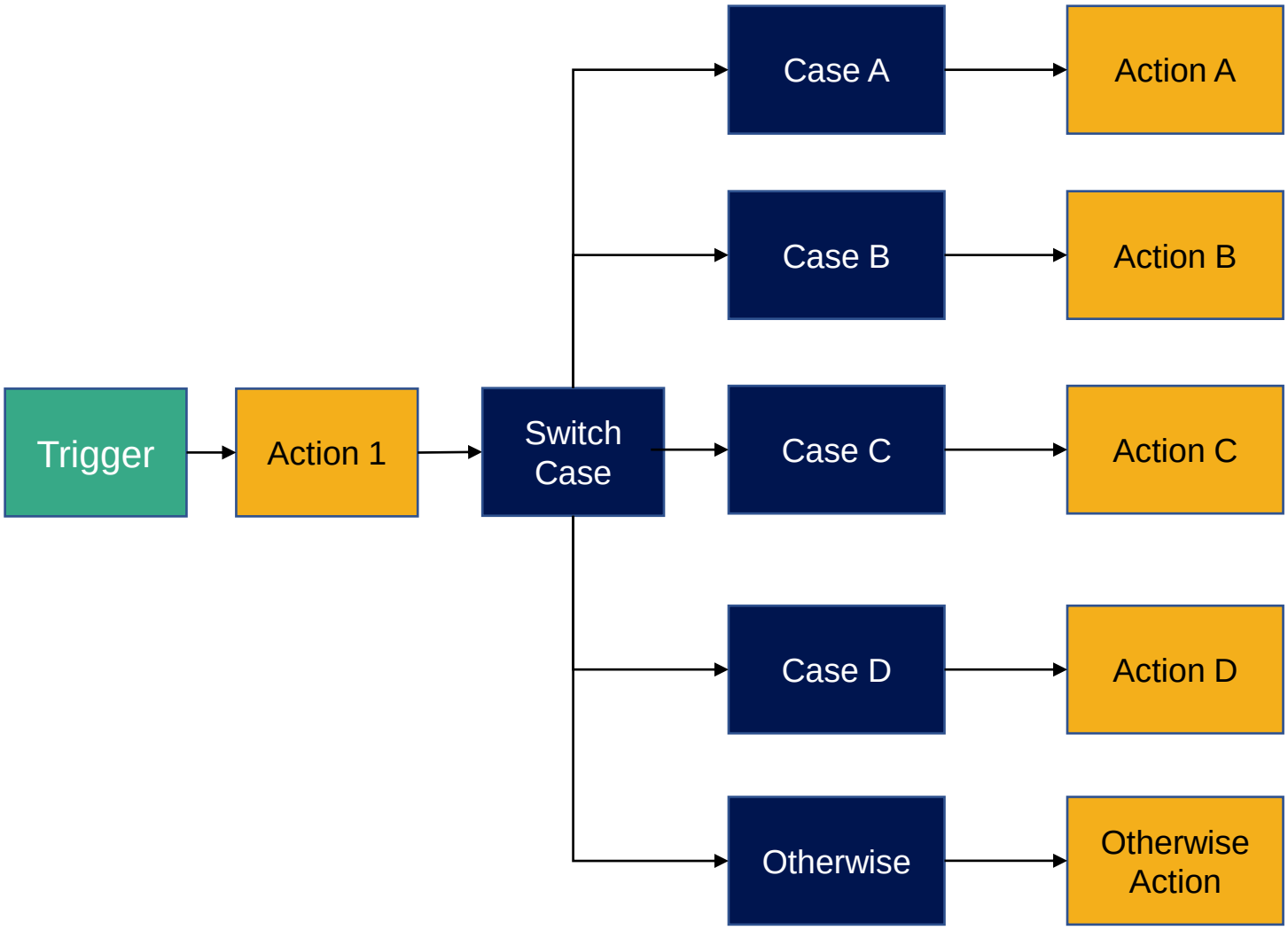
Built-in controls



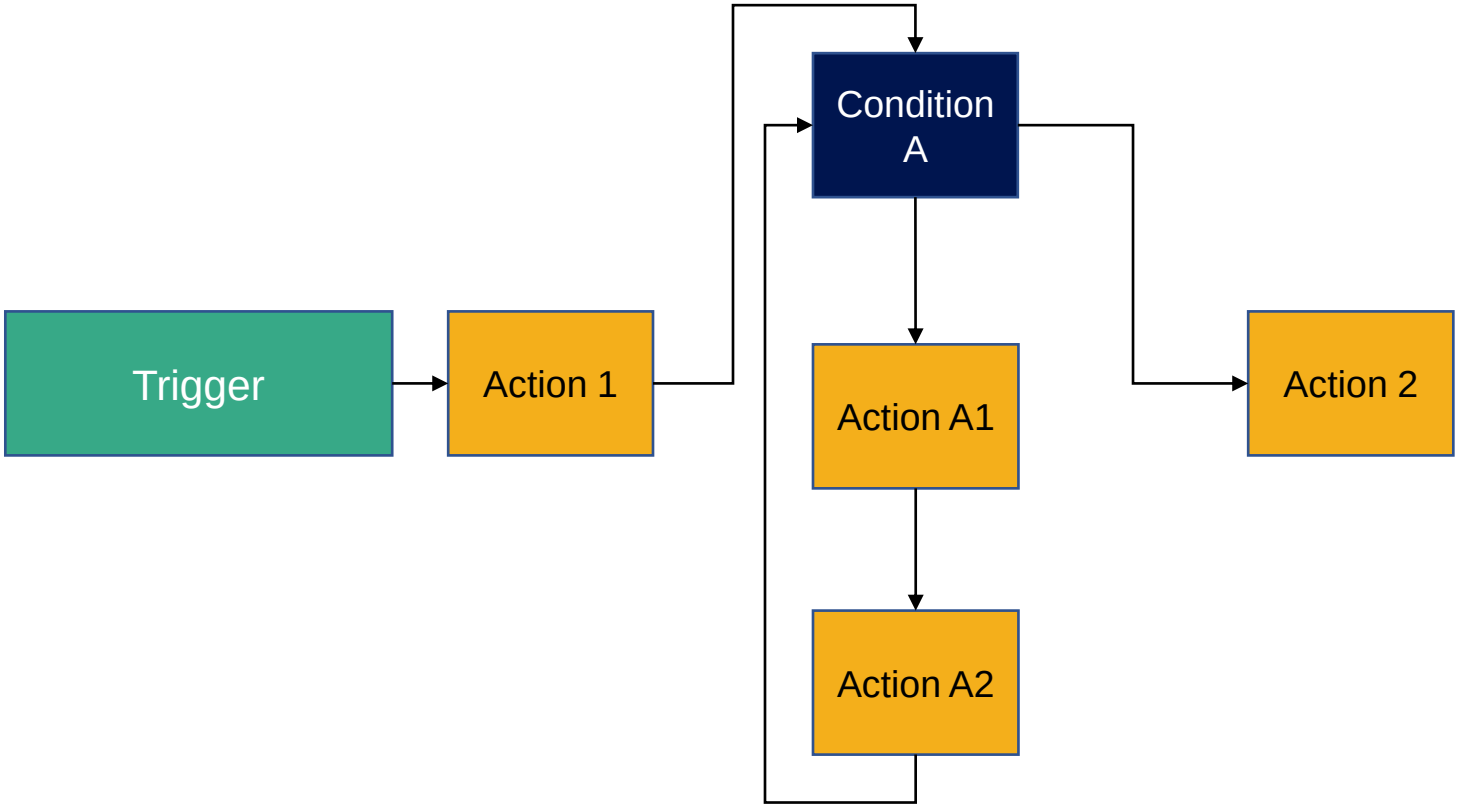
Condition



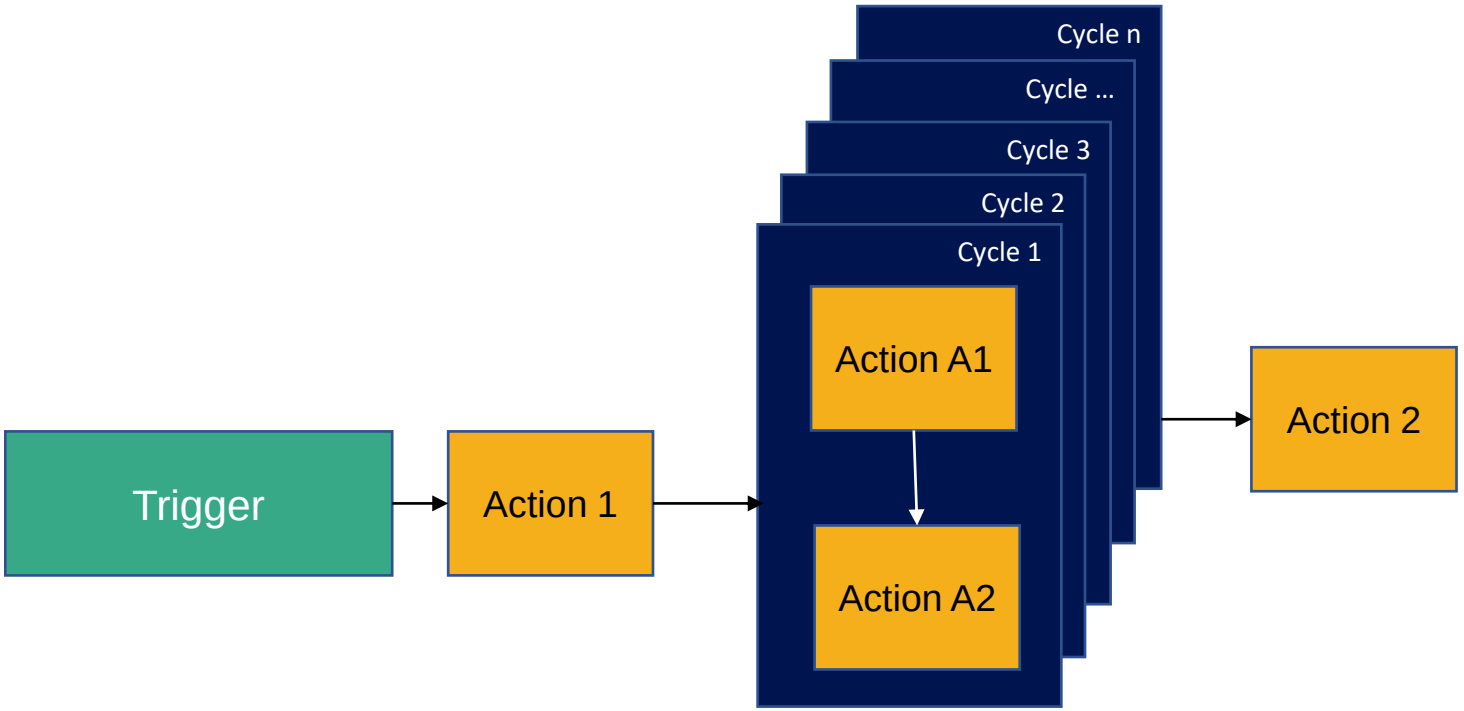
Switch



Loop – Do Until

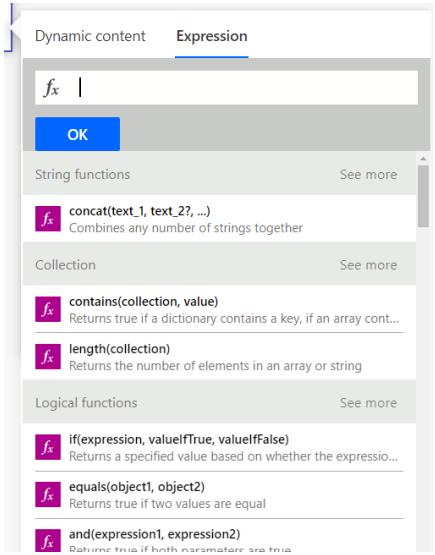


Loop – Apply to Each



Expressions

- A sequence that can contains one or more functions, operators, variables, explicit values, or constants, that use to Workflow Definition Language
- Think of Expressions as Power Automate's version of inline formulas or functions – they produce an output by taking in an input (note, sometimes inputs are not required)
- Expressions can be added to any parameter of a connector's actions or triggers
- See: https://docs.microsoft.com/en-us/azure/logic-apps/workflow-definition-language-functions-reference



String functions
concat, replace, toUpper

Collection functions
contains, join, length

Logical comparison functions
and, greater, lessOrEquals

Conversion functions
Int, bool, array

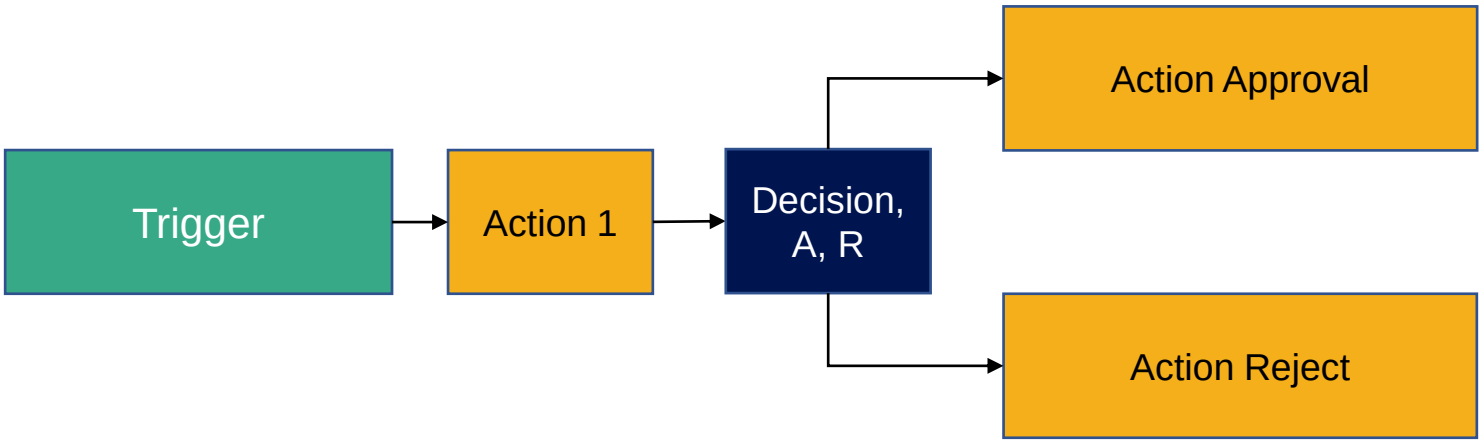
Math functions
add, max, min, mod

Date and time functions
addDays, utcNow

Workflow functions
item, result, trigger

URI passing / data
uriPath, coalesce

Approvals



- Examples:
  - Approving expense reports
  - Getting feedback on new document
  - Approving vacation requests

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Types of Approvals

Approve/Reject - Everyone must approve	Approve/Reject - First to respond	Custom Responses - Wait for all responses	Custom Responses - Wait for one response
Approvers are given two options: Approve or Reject. An “approve” is needed from each approver to continue; or one rejection.	Approvers are given two options: Approve or Reject. An “approve” or “reject” is needed from any one person.	Approvers are given options that you choose. All approvers must respond.	Approvers are given options that you choose. Only one response is needed.

Approvers can add additional comments

Approval Information

Prerequisites

- Microsoft Dataverse database
- Valid license (Office 365)
- Permissions
- Users in your tenant

Power Automate Apps

Power Automate Desktop	• Enables you to create Desktop flows • Available with Windows 10 and 11 • Has a whole different UI and experience from Power Automate portal / cloud
Power Automate Mobile	• Get Power Automate on your mobile, as an app from the app store • Trigger flows, see activity, see why flows failed, create flows using very basic templates
Power Automate Portal	• Also called Power Automate cloud • This is what you see when you go to the Power Automate website

Data Operations

Compose	Constructs an arbitary object from the action's inputs
Create CSV table	Create CSV table
Create HTML table	Create HTML table
Filter array	Filters an array
Join	Joins all the elements of an array into a string, using the specified "Join with" separator between each element.
Parse JSON	Specify the schema of JSON content
Select	Select the specified properties from all elements of the 'From' array into a new array.

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Power Virtual Agents

Why?

- Empowers teams to easily create powerful chatbots using a guided, no-code GUI without the complexity of data science, AI, or front-end development

Business value and use cases

- Empower teams and reduce costs
  - Create chat bots that your employees can use to answer their most basic HR, Finance, and general business questions
  - Free up your agent's time to deal with complex issues, whereas simple issues can be dealt with by the bot
- Improve customer satisfactions
  - Create chatbots that your customers can interact with, solving their issues instead of going through your website or having to call your business
  - Chatbots can also authenticate your users and give them custom data based on that authentication
  - Based on topic flows, transfer customer to other topics, to an agent, or to a broader Power Automate flow

Types

- There are 2 deployments of PVA: (1) stand-alone web app, (2) discrete app within Microsoft Teams

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Other use cases from Microsoft

- COVID-19 infection rate and tracking information
- Sales help and support issues
- Opening hours and store information
- Employee health and vacation benefits
- Common employee questions for businesses

Power Virtual Agents version	Use cases	More information
Web app at https://web.powerva.microsoft.com	• You're an IT admin and want to create bots for your customers to engage with • You've used chatbot services in the past, and want to trial or test Power Virtual Agents • You're familiar with advanced chatbot concepts, such as entities and variables, and want to create complex chatbots	Get started with Power Virtual Agents web app
Microsoft Teams app	• You're an employee or member of an organization or team and want to create chatbots to answer common questions posed by other employees or teammates • You want to use advanced concepts, such as entities and variables, but have the chatbot available only internally • You want to create and distribute a chatbot in the shortest time possible	Get started with Power Virtual Agents in Teams

https://docs.microsoft.com/en-us/power-virtual-agents/fundamentals-what-is-power-virtual-agents

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PVA Elements

Topics

- Discrete conversation path that details how a conversation is initiated and how it flows through based on user input
- Topics have **trigger phrases**, statements that users say to start the conversation
- Each issue should be one topic
- System topics are pre-populated topics that are common to every chatbot, with trigger phrases like Hello", "Speak to agent", etc.

Entities

- An information unit that represents a certain type of a real-world subject
- Examples include age, colors, numbers, emails, etc.
- Entities are used to enhance natural language understanding and AI – PVA uses entities to identify what a user is saying in a dialog, and what to keep as a variable
- PVA comes with many of the above **pre-built entities**, but you can also create your own (called **custom entities**) using Closed Lists or *REGEX*

Actions

- Actions can be calling a Power Automate flow, transferring to agent, authentication, retrieving information from D365, ending the conversation, etc.
- Actions can use inputs and produce outputs from / to PVA
- Note: flows must be in same environment, and must be a part of "Solutions" for it to work

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Topic Elements

Topic X (“gift card troubleshooting”)

Authoring canvas

Trigger phrases	Phrases that initiate the topic (“gift card issue”)
Message node	Send a message to a user (“sorry to hear that”)
Question node	Ask a question (“what type of gift card is it?”) – use defined multiple choice, or better yet, use entities for more natural language conversation
Condition node	Condition the conversation flow based on user’s response, or any other variable
Action node	Call a Power Automate flow, redirect user to another topic, end the conversation by survey, or transfer to agent

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Publishing PVA